COMMISSION 27 OF THE I.A.U.

INFORMATION BULLETIN ON VARIABLE STARS

Nos. 1101-1200

1976 February - November

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C O N T E N T S

1976

A U T H O R   I N D E X

INDEX OF VARIABLES

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Number 1101

Konkoly Observatory
Budapest
1976 February 11

Rosemary Hill Observatory, Department of Physics and Astronomy, University of Florida, Contribution No. 65.

RADIO EMISSION FROM WOLF-RAYET BINARIES

Three Wolf-Rayet binaries have been examined for radio emission with the NRAO* three element interferometer. The Wolf-Rayet systems observed were CV Ser (WC8 + B0:), V 444 Cyg (WN5 + 06), and HD 193793 (WC7p + 05). Based on the infrared excesses and electron densities given by Hackwell, et al. (1974), detectable radio emission was considered likely.

The radio observations were made during October 18-25, 1975. The stars were observed simultaneously at 3.7 cm (8085 MHz) and 11.1 cm (2695 MHz). The interferometer spacings used were 900, 1800, and 2700 meters. At least 19 hours were spent observing each star.

A radio source was observed to coincide with the optical position of HD 193793. The radio position agrees with the AGK 3 position, allowing for proper motion, to within 0.5 arc seconds. The radio source was unresolved, indicating an angular diameter of less than 0.5 arc seconds. The observed flux densities for HD 193793 were 21.0 $\pm$ 1.0 mJy** and 26.2 $\pm$ 1.1 mJy at 3.7 cm and 11.1 cm, respectively. During the time HD 193793 was observed, October 23-25, no variability was observed within the sensitivity limits of the observations. The daily mean flux density values repeat to within 4 mJy. Short term variations, having a time scale of about one hour and an amplitude of 8 mJy, can not be ruled out.

No radio emission at either frequency was observed from either CV Ser or V 444 Cyg. An upper limit for the radio emission for these stars is approximately 2 mJy. Since radio emission from binary stars is highly variable, radio emission from CV Ser and V 444 Cyg should not be discounted.

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* Operated by Associated Universities, Inc. under contract with the National Science Foundation.

** 1 mJy = 10^{-29} W m^{-2} Hz^{-1}

Reference:

Hackwell, J. A., Gehrz, R. D., and Smith, J. R. 1974, Ap. J., 192, 383

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1102

Konkoly Observatory
Budapest
1976 February 12

PHOTOELECTRIC V LIGHT CURVE OF THE ECLIPSING BINARY RT PERSEI

We made 911 photoelectric observations, in V light, of the eclipsing binary RT Persei (BD+46°0740) by the 40 cm Cook refractor of the Teramo Observatory during 18 nights from the end of 1971 to the end of 1973. We used a photometer equipped with an EMI 9502 photomultiplier and a Schott GG14+GG13 filter (2 mm). We reduced in phase the observations by using the linear ephemeris

$$(1)\quad \text{Hel.J.D. I} = \underset{\pm 1}{2441304.3590} + \underset{\pm 18}{0^{d}.84939889} \cdot E.$$

We computed (1) by the least square method from the times of minima: we got the last ones analizing our observed minima by the Kwee and Van Woerden method and by using the preliminary elements

$$T_o = 2441304.3595$$
$$P_o = 0^{d}.84940032$$

As comparison stars we used two anonymous field stars (Fig.1). The coordinates (related to the 1975 equinox) of the comparison stars and the variable are as follow:

a	$3^h22^m36^s$	$46°44'.3$
b	3 19 23	46 22.5
V	3 21 55	46 29.5

We used "a" as comparison star and "b" as check star. The sequence of observations has been:

sky, a, V, b, V,....

By doing so, we could exclude possible variability of the "a" star with a good level of confidence.

From Fig.2 we can see that the light-curve is variable in both the levels of maxima and minima and, moreover, the latter ones are non symmetrical.

In a forthcoming paper we will discuss the photometric elements of this variable derived by different methods of solution (Russell and Merrill, 1952; Kitamura, 1965; Wood, 1971; Wilson and Devinney, 1971).

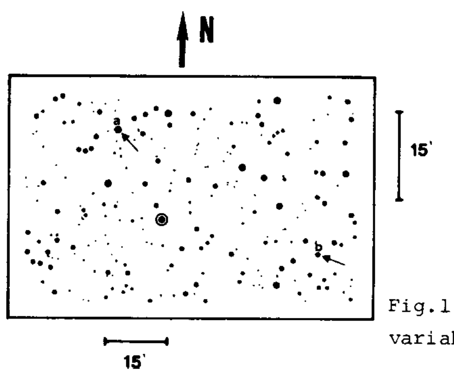

Fig.1. Chart of the variable RT Persei

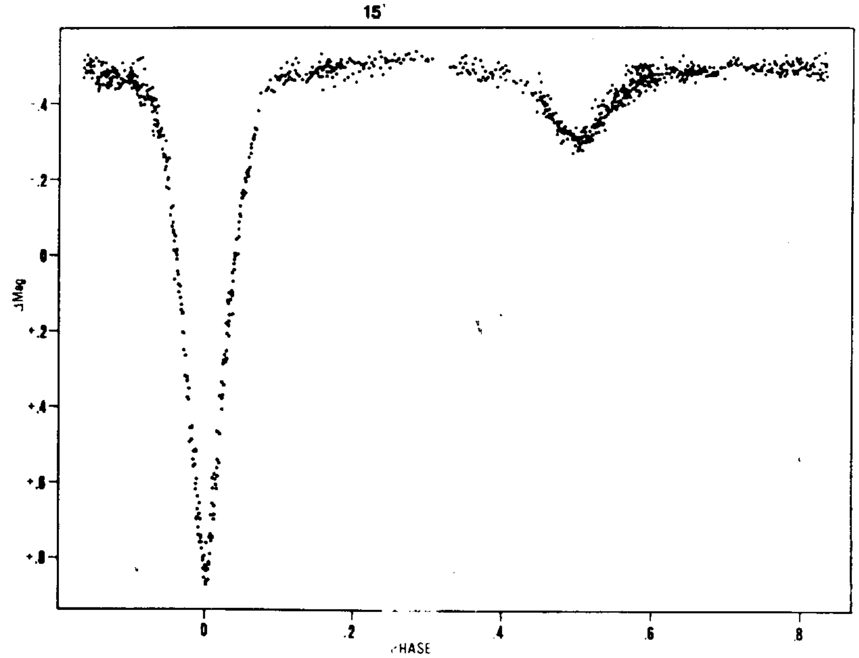

Fig.2. Photoelectric observations of RT Persei

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Capodimonte Observatory
Naples, Italy

References:

Kitamura, M., 1965, Advances in Astr.and Astrophys.,3,27
Russell,H.N., Merrill, J.E., 1952,Contr.Princeton, 26
Wilson, R.E., Devinney, E.J., 1971,Astroph.J.,166, 605
Wood, D.B., 1971, Astron.J., 76, 701

COMMISSION 27 OF THE I. A. U.
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Number 1103

Konkoly Observatory
Budapest
1976 February 18

PHOTOELECTRIC OBSERVATIONS OF δ CETI

A β CMa variable, δ Ceti was observed photoelectrically in yellow and blue lights at the Ege University Observatory in December 1974 and January 1975. The observations were carried out with the 48 cm Cassegrain telescope with an unrefrigerated 1P21 photomultiplier. The wavelength, maximum permeability, half width and thickness of the used filters are given in Table 1.

Table 1

Colour	Wavelength (Å)	max. Per. (%)	HW (Å)	Thickness mm
B	4350	64	920	8
V	5550	53	860	7

BD - 0° 378 was used as the comparison star.

In each colour 5 light curves were obtained which have 5 maxima. In the observed values, the necessary reduction and corrections were made.

Average amplitudes of light curves were calculated as follows:

$$\bar{A}_B = 0^{m}.034 \pm 2$$
$$\bar{A}_V = 0^{m}.032 \pm 2$$

The magnitude differences, measured on December 11, 1974, were transformed to the UBV system. We used the transformation coefficients given by Ibanoǧlu* (1974). The light curve on this night is shown in Fig. 1. The magnitude which we found in UBV system, as follows:

* Ibanoǧlu obtained the transformation coefficients in the same condition, like ours.

	m (B)	m (V)
max:	$3^{m}.919$	$4^{m}.127$
min:	$3^{m}.959$	$4^{m}.161$

$$(B-V) = -0^{m}.209 \pm 4$$

Jerzykiewicz (1970), has given the light elements for this star as:

$$\text{Max.Blue Light JD Hel.} = 2438\ 385.6860 + 0^{d}.16113800\ E$$
$$\pm 8 \qquad \pm 25$$

The calculated max.times, due to Jerzykiewicz (1970), and our observed max. times and $(O-C)_{max.t.}$ values are given in Table 2.

Table 2

Observed max. t.	Calculated max.t.	$(O-C)_{max.\ t.}$
2442 393.3543	2442 393.3492	$+0^{d}.0051$
419.2855	419.2924	-0.0069
428.3162	428.3161	+0.0001
430.2537	430.2498	+0.0039
431.2233	431.2166	+0.0067

(O-C) values given in Table 2, are plotted agains time, and the (O-C) variation fitted approximately to sinecurve, as given in Fig. 2.

The new light elements which [illegible] found, are:

$$\text{Max.Blue Light JD Hel.} = 2442\ 428.316 + 0^{d}.16113800\ E + a \sin 2\pi \frac{t}{P},$$

$$(\text{or, } a \sin 2\pi \frac{E}{236}).$$

Here, $a \simeq 0^{d}.007$ amplitude of (O-C) variation

$P' \simeq 38^{d} \simeq 236$ E period " " " "

t = number of days after JD 2442 428.3161

We consider to study further on the same object for finding the reliability of our results.

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Fig. 1

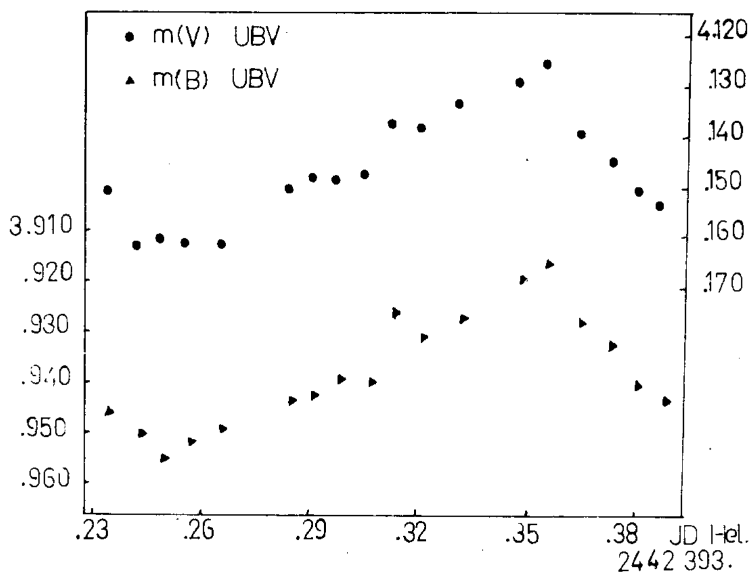
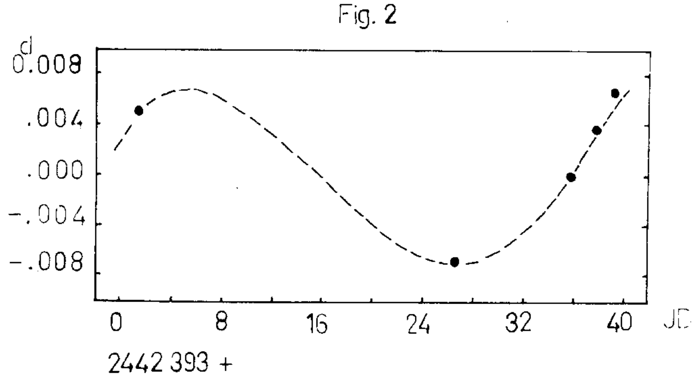


Fig. 2



References:

Ibanoğlu, C. 1974, A.Ap.Supp. 13, 119.
Jerzykiewicz, M. 1970, Lowell Obs. Bull. No. 155. 7, 189.

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Konkoly Observatory
Budapest
1976 February 19

FURTHER DETAILS ABOUT THE NEW ECLIPSING BINARY
S 10796 = 71 DRACONIS

In IBVS 1071 W. Fürtig announced that the bright star 71 Dra = HD 193 964 (B9V, m_v = 5.6) probably is an eclipsing binary. Hube (1973) found a spectroscopic period of P = $5^d.298$ 111. With the aid of this period W. Fürtig observed another minimum on January 28/29, 1976 (comparison star HD 192 455). From these observations the following elements were found:

$$\text{Min.} = \text{JD } 244\ 2806.415 + 5^d.2984 \cdot E$$

The light outside eclipse seems to be constant. No secondary minimum could be found (Fig. 1).

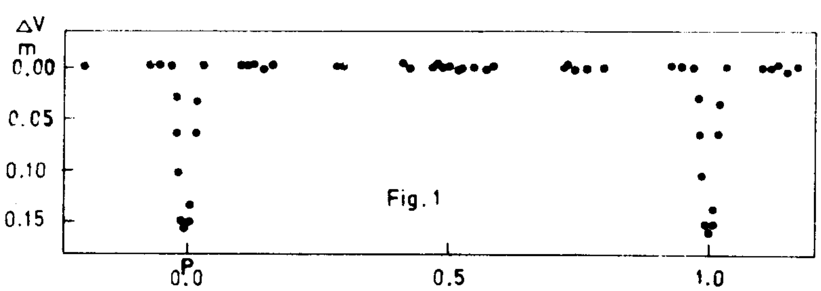

Fig. 1

One of us (L.M.) determined photometric elements according to a method given by Irwin (1962). During the time of the observed minimum 71 Dra was very near the horizon and the observations are only of poor quality. Therefore the derived photometric elements are only preliminary. The primary minimum is a transit. The following elements have been found:

R = 1.75	ϕ_1 = 0.2688	i = $86^\circ.85$
k = 0.35	ϕ_2 = 0.3381	L_g = 1.00
A = 0.015 060	r_g = 0.157	x_g = 0.5
B = 0.006 115	r_s = 0.055	e = 0

From these elements we can conclude that the invisible companion is a sun-like star. This is also in agreement with the spectroscopic elements given by Hube (1973). In Fig. 2 the theoretical light curve and the observed points are plotted.

We hope to get better observations and better elements in summer.

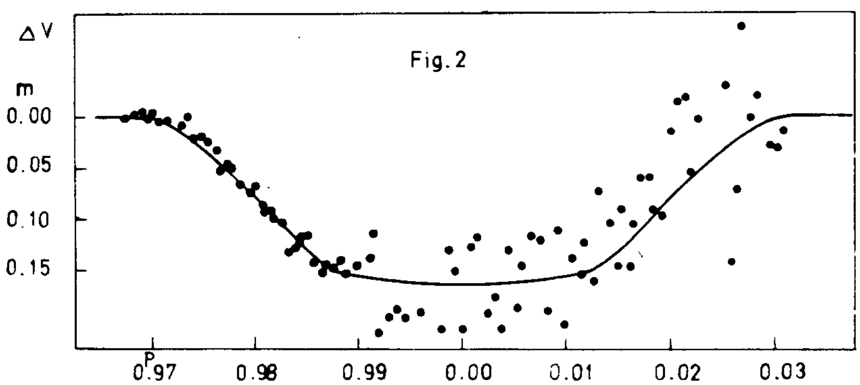

Fig. 2

W. FÜRTIG, L. MEINUNGER

Sonneberg Observatory
of Central Institute for Astrophysics
of Academy of Sciences of the GDR.

References:

Hube, P. 1973: The Spectrographic Orbit of HD 193 964. JRAS Canada 67, 161.

Irwin, J. 1962: Orbit Determinations of Eclipsing Binaries. Stars and Stellar Systems Vol. II, 584. Chicago.

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Number 1105

Konkoly Observatory
Budapest
1976 February 26

FLARE SUMMARY FOR UV CETI
SEPTEMBER 27 - OCTOBER 14, 1975

At the end of September and for two weeks in October 1975, the flare star UV Ceti (RA = $01^h37^m12^s$, decl.=$-18^o08'$ (1966.0)), visual magnitude 12.9, spectral type dM5.5e) was monitored from Boyden Observatory with the 41 cm aperture Nishimura Reflector. The detector was a dry ice cooled EMI6256A photomultiplier tube. A standard Johnson B. filter was used throughout the observations.

The Table gives details of the observations over a total monitoring time of $77^h04^m24^s$.

Throughout the period level of activity was reasonably high, twenty-six flares being noted. There were many other which are marked as uncertain due to unfavourable observing conditions. Especially interesting is the very intense flare peaking at $01^h35^m21^s$ U.T. on the 10th October. Although we have recorded larger flares from UV Ceti, this one was very prominent with an $\frac{I_{o+f}-I_o}{I_o}$ value of approximately 17.7.

Also on the 10th another relatively intense flare of $\frac{I_{o+f}-I_o}{I_o}$ value 8.3 peaked at $23^h39^m48^s$. Both these flares showed the characteristic flash phase followed by the gradual decline of UV Ceti type flare stars. They are similar in contour to those recorded on previous occasions from UV Ceti by A.H. Jarrett, J.P. Eksteen and J.B. Gibson.

A.H. JARRETT and J.B. GIBSON

Boyden Observatory,
Department of Astronomy
University of the Orange Free State
Bloemfontein, Republic of South Africa

References:
1. Jarrett A.H. and Eksteen J.P., 1969, I.B.V.S. No. 349
2. Jarrett A.H. and Eksteen J.P., 1969, I.B.V.S. No. 406
3. Jarrett A.H. and Eksteen J.P. 1970, I.B.V.S. No. 412
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5. Jarrett A.H. and Eksteen J.P. 1970, MNASSA, 29, p.115
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7. Jarrett A.H. and Gibson J.B. 1975, I.B.V.S. No. 1017.

Flare Summary for UV Ceti - September 27 - 14 October 1975

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
27th	$3^h20^m30^s$	$20^h36^m02^s$	$20^h36^m06^s$	$20^h36^m36^s$	Possibly a small flare	0.26±0.092	1.3172
		20 38 51	20 38 57	20 39 11	Possibly a small spike	0.45±0.082	1.3052
	This is	21 03 46	21 03 48	21 04 30	Small spike	0.81±0.09	1.2150
	probably	21 04 46	21 04 51	21 05 18	Poss. a small slow flare	0.31±0.09	1.2117
	one event.	21 05 18	21 05 36	21 06 00	Poss.a small slow flare	0.25±0.09	1.2094
		22 53 38	22 53 40	22 54 00	Small spike	0.69±0.10	1.0281
		23 52 17	23 52 18	23 52 20	Probably a narrow spike	4.09±0.15	1.0236

<u>Monitoring Times</u>(U.T.)

$20^h18^m48^s$ - $22^h57^m24^s$ There was apparently distant lightning throughout night.
22 59 36 - 23 05 18
23 10 36 - 23 23 12 $23^h36^m24^s$ - $24^h00^m00^s$

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
28th	$6^h53^m36^s$	00 05 45	00 05 52	-	Spike	3.60±0.14	1.0307
		-	00 06 02	00 09 06	Spike with exponential decay.	1.36±0.14	
		00 41 07	00 41 09	00 41 17	Low intensity spike	0.91±0.15	1.0648
		01 27 19	01 28 09	01 32 48	Flare	1.51±0.14	1.1507
		20 02 02	20 02 19	-	Spike	3.53±0.13	1.4697
		-	20 02 31	20 20 -	Exponential decay	0.86±0.13	-
		20 24 -	20 26 -	20 34 -	Probably a slow flare	0.13±0.08	1.3446
		20 38 03	20 38 07	20 38 28	Spike	1.99±0.10	1.2925

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$ - $01^h01^m18^s$ $19^h54^m18^s$ - $23^h20^m24^s$
01 07 12 - 02 21 54 23 26 42 - 23 31 18
02 23 12 - 03 02 48 23 32 42 - 24 00 00

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
29th	$7^h03^m30^s$	00 26 30	00 27 54	00 30 06	Slow flare	0.69±0.11	1.0535
		00 30 17	00 30 20	00 32 00	Spike	1.00±0.11	1.0563
		02 03 54	02 04 24	02 06 -	Slow flare	0.53±0.11	1.2740
		20 31 26	20 31 28	20 31 36	Low intensity spike	0.84±0.10	1.3036

Table (continued)

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
29th	$7^h03^m30^s$	$20^h46^m58^s$	$20^h47^m01^s$	-	Spike	0.75±0.10	1.2445
		-	20 47 06	$20^h48^m48^s$	Exponential decay	0.31±0.10	
		20 49 30	20 49 40	20 51 06	Probably a slow flare	0.45±0.10	1.2354
		20 53 24	20 53 30	20 53 42	A low intensity spike	0.75±0.12	1.2228
		-	20 54 10	20 57 30	Slow flare	0.63±0.12	1.2206
		21 10 30	21 11 01	21 13 06	Flare	1.00±0.11	1.1713
		21 18 46	21 18 50	-	Spike	1.73±0.11	1.1514
		-	21 18 52	21 19 55	Exponential decay	0.93±0.11	
		21 25 51	21 25 54	-	Spike	2.47±0.11	1.1350
		-	21 25 59	21 27 30	Exponential decay	1.33±0.11	

Monitoring Times (U.T.)

$00^h00^m00^s$- $01^h09^m36^s$	$19^h38^m24^s$- $20^h07^m24^s$
01 27 42 - 03 02 36(dawn)	20 09 30 - 23 16 18
19 31 06 - 19 37 00	23 22 42 - 24 00 00

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
30th	$4^h41^m18^s$	00 08 27	00 08 44	00 09 42	Small flare	0.22±0.11	1.0387
		00 16 33	00 16 38	-	Spike	2.47±0.11	1.0458
		-	00 16 45	00 19 36	Decay	1.33±0.11	
		00 20 29	00 20 30	00 20 34	Narrow spike	1.28±0.11	1.0497
		00 46 48	00 46 52	-	Spike	1.10±0.11	1.0844
		-	00 47 00	00 47 36	Decay	0.39±0.11	
		01 31 46	01 31 51	-	Spike	1.40±0.11	1.1807
		-	01 31 59	01 32 54	Decay	0.33±0.11	
		01 49 27	01 49 32	01 52 12	Flare (noisy trace)	1.20±0.19	1.2348
		02 34 30	02 35 18	02 37 42	Probably a slow flare	0.29±0.12	1.4363
		21 14 29	21 14 30	21 15 00	Possibly a flare	1.00±0.15	1.1524
		22 03 41	22 03 43	22 04 30	Possibly a flare.Noisy trace.	0.90±0.22	1.0628
		22 23 30	22 23 33	22 23 43	Spike	1.82±0.20	1.0414

Table (continued)

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
Monitoring Times (U.T.)							
$00^h00^m00^s$ - $03^h02^m06^s$							
20 48 42 - 21 52 18							
21 53 30 - 22 12 00							
22 14 54 - 22 32 00							
1st	$0^h47^m06^s$				No flares observed. The sky was good after clouds.		
Monitoring Times (U.T.)							
$23^h09^m54^s$ - $23^h25^m30^s$							
23 27 18 - 23 45 18							
23 46 30 - 24 00 00							
2nd	$7^h56^m30^s$	$00^h08^m43^s$	$00^h08^m53^s$	-	Spike	0.92±0.14	1.0459
		-	00 08 58	$00^h10^m30^s$	Decay	0.37±0.14	
		01 28 50	01 29 11	01 34 30	Flare	1.90±0.12	1.1955
		01 34 37	01 34 53	01 36 30	Flare	0.95±0.11	1.2127
		01 59 01	01 59 18	01 59 31	Possibly a flare	0.78±0.10	1.3005
		19 07 24	19 07 32	-	Flare	0.67±0.13	1.7728
		19 08 47	19 10 00	19 16 00	Slow flare	0.72±0.13	1.7488
		22 48 35	22 48 37	22 48 57	Possibly a precursor	0.29±0.09	1.0216
		22 50 00	22 51 01	22 51 48	Probably a slow flare	0.43±0.08	1.0209
		23 54 56	23 54 58	23 55 12	Possibly a spike	0.50±0.10	1.0370
Monitoring Times (U.T.)							
$00^h00^m00^s$ - $03^h00^m00^s$							
18 55 30 - 23 02 36							
23 10 36 - 24 00 00							
3rd	$8^h11^m30^s$	19 11 52	19 11 53	-	Narrow spike	1.57±0.10	1.6953
		19 12 02	19 12 03	19 12 15	event	1.04±0.10	1.6938
		20 40 49	20 40 56	20 41 06	Possibly a precursor	0.53±0.10	1.2127
		20 45 05	20 45 17	20 49 06	Flare	1.06±0.08	1.1994
		20 57 43	20 57 44	20 57 54	Possibly a precursor	0.63±0.12	1.1649

Table (continued)

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
3rd	$8^h11^m30^s$	$20^h58^m28^s$	$20^h58^m42^s$	$21^h02^m12^s$	Flare	1.74±0.12	1.1624
		21 52 22	21 52 25	-	Flare	1.10±0.09	1.0622
		21 52 45	21 52 49	-	Spike	1.47±0.11	1.0617
		-	21 53 01	21 54 42	Decay	0.74±0.11	
		22 29 03	22 02 08	22 30 18	Maybe a small flare	0.38±0.08	1.0286
		22 34 53	22 34 53	22 35 01	Narrow spike	1.00±0.11	1.0255
		23 49 06	23 49 11	23 49 54	Flare	0.56±0.10	1.0356

Monitoring Times (U.T.)

$00^h00^m00^s$ - $00^h29^m00^s$
00 32 54 - 02 58 00
18 33 06 - 18 54 42
18 56 06 - 23 00 24
$23^h06^m18^s$ - $23^h29^m30^s$
23 31 42 - 24 00 00
23 36 00 - 23 37 30
23 55 24 - 23 58 18

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
4th	$3^h57^m48^s$	$02^h11^m32^s$	$02^h11^m34^s$	$02^h11^m36^s$	Possibly a narrow spike	1.69±0.17	1.3931
		02 13 13	02 13 24	02 14 24	Spike	1.25±0.17	1.4027
		18 57 03	18 57 05	18 57 24	Possibly a flare	0.54±0.13	1.7988
		19 02 24	19 02 36	-	Probably weak slow	0.31±0.12	1.7444
		19 03 35	19 03 38	19 05 00	flares	0.23±0.12	1.7346
		19 05 14	19 05 16	19 06 00	Possibly a flare	0.54±0.18	1.7195
		19 10 18	19 10 48	19 27 -	Possibly a slow flare	0.31±0.13	1.6706

Monitoring Times (U.T.)

$00^h00^m00^s$ - $00^h25^m00^s$
00 26 06 - 00 36 24
00 38 12 - 00 45 48
$00^h47^m24^s$ - $01^h32^m00^s$
01 35 30 - 02 32 48
18 28 06 - 19 30 24
19 31 48 - 20 02 30

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
8th	$5^h29^m24^s$	18 21 52	18 21 54	18 21 57	Spike	1.21±0.18	2.0285
		18 22 02	18 22 03	-	Probably a spike	1.57±0.18	2.0264
		18 22 10	18 22 10	18 22 15	Probably associated with previous event	1.43±0.18	2.0248
		18 30 24	18 30 32	18 30 48	A spike-like flare	0.69±0.14	1.9185

Table (continued)

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
8th	$5^h29^m24^s$	$18^h52^m08^s$	$18^h52^m11^s$	$18^h52^m17^s$	Signal scarcely distinguished above noise	0.60±0.17	1.6957
		18 59 56	18 59 57	19 00 01	Spike	1.27±0.15	1.6303
		19 00 11	19 00 12	19 00 26	A low intensity spike	0.40±0.15	1.6283
		19 24 18	19 24 25	19 25 18	Probably a flare	0.53±0.17	1.4612
		21 11 48	21 12 00	-	Possibly a spike	0.53±0.14	1.0928
		-	21 12 37	21 16 00	Possibly a slow flare	0.41±0.14	1.0918
		21 21 19	21 21 24	21 24 00	Maybe a flare	0.22±0.10	1.0778
		22 24 41	22 24 46	22 24 53	Maybe a spike	1.06±0.13	1.0217
		23 40 58	23 41 10	-	Spike	0.74±0.07	1.0457
	One	23 41 19	23 41 25	-	Spike	1.37±0.09	1.0460
	event	23 41 46	23 42 00	-	Slow flare	0.63±0.09	1.0466
		23 42 48	23 43 42	23 59 30	Slow flare	0.44±0.14	1.0483

<u>Monitoring Times</u> (U.T.)

$18^h19^m48^s$ - $22^h40^m30^s$
22 45 18 - 23 29 54
23 35 54 - 24 00 00

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
9th	$7^h20^m42^s$	01 04 13	01 04 22	01 07 00	Flare	0.96±0.13	1.2035
		02 29 56	02 29 57	02 30 42	Flare	0.56±0.12	1.6406
		19 05 20	19 05 22	19 05 36	Probably a spike	0.54±0.15	1.5596
		20 41 29	20 41 30	20 41 39	Probably a spike	0.64±0.15	1.1467
		21 56 08	21 56 09	21 56 16	Probably a spike	0.56±0.12	1.0349
		23 11 26	23 11 37	-	Spike	1.47±0.11	1.0266
		-	23 11 51	23 14 30	Decay	0.40±0.11	

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$ - $01^h45^m42^s$	$20^h05^m48^s$ - $20^h37^m48^s$
01 49 24 - 02 41 48	20 39 00 - 21 42 18
18 10 06 - 19 13 48	21 43 30 - 22 12 18
19 15 00 - 19 29 42	22 18 18 - 22 37 18
19 39 42 - 19 59 36	22 49 12 - 22 56 18
20 00 48 - 20 04 12	23 08 12 - 23 28 18
	23 49 24 - 24 00 00

Table (continued)

Date	Total Hours	Rise	Max. U.T.	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
10th	$7^h20^m42^s$	$01^h14^m22^s$	$01^h14^m25^s$	$01^h18^m48^s$	Flare	1.89±0.16	1.2493
		01 35 11	01 35 21	02 00 00	Flare	17.74±0.12	1.3326
		01 42 22	01 42 39	01 43 36	Slow flare (after previous one)	0.50±0.18	1.3665
		02 10 16	02 10 18	02 11 00	Probably a flare	0.48±0.11	1.5244
		19 18 52	19 18 59	19 22 30	Probably a flare	0.35±0.13	1.4470
		19 40 20	19 40 21	19 40 28	Narrow spike	2.57±0.18	1.3376
		19 41 42	19 41 58	19 43 18	Probably a flare (noisy trace)	0.44±0.18	1.3304
		20 32 43	20 32 57	20 33 54	Flare	0.50±0.12	1.1579
		21 26 58	21 27 07	21 28 30	Flare	0.53±0.11	1.0594
		21 21 00	21 31 13	21 33 18	Probably a flare Noisy trace	0.45±0.12	1.0546
		23 39 46	23 39 48	-	Spike flare	8.31±0.17	1.0525
		-	23 40 11	23 47 00	Decay	0.58±0.09	
		23 49 55	23 49 56	23 49 58	Narrow spike	1.50±0.12	1.0646

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$ - $00^h04^m06^s$ $18^h20^m00^s$ - $18^h53^m42^s$
00 05 30 - 00 39 54 18 54 48 - 22 09 42
00 41 24 - 02 50 00 22 11 30 - 22 33 18
22 36 48 - 24 00 00

Date	Total Hours	Rise	Max. U.T.	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
12th	$4^h04^m48^s$	20 01 30	20 01 48	20 07 30	Flare	0.70±0.17	1.2247
		21 12 31	21 12 32	21 12 37	Narrow spike	1.27±0.11	1.0680
		21 56 48	21 57 04	22 01 00	Probably a slow flare	0.33±0.13	1.0268
		22 54 18	22 54 34	-	Spike flare	5.33±0.14	1.0241
		-	22 55 00	23 03 00	Decay	0.57±0.09	

<u>Monitoring Times</u> (U.T.)

$19^h51^m06^s$ - $22^h25^m30^s$
22 28 36 - 24 00 00

Date	Total Hours	Rise	Max. U.T.	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
13th	$4^h13^m24^s$	00 29 00	00 29 14	00 29 39	Probably a weak spike	0.26±0.09	1.1509

Table (continued)

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
13th	$4^h13^m24^s$	$00^h29^m39^s$	$00^h30^m00^s$	$00^h31^m48^s$	Probably a slow flare	0.32±0.10	1.1528
		00 34 08	00 34 12	00 36 42	Weak flare	0.53±0.06	1.1633
		23 10 47	23 10 48	23 10 50	Possibly a precursor (spike)	1.17±0.13	1.0363
		23 12 30	23 12 32	-	Spike	3.08±0.13	1.0377
		-	23 12 52	23 14 30	Decay	0.42±0.13	

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$- $02^h04^m36^s$
02 07 12 - 02 40 00
22 21 12 - 22 49 00
22 50 24 - 23 44 45
23 46 06 - 24 00 00

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
14th	$5^h42^m36^s$	01 43 02	01 43 06	01 43 14	Spike	1.00±0.14	1.4527
		20 45 02	20 45 14	-	Spike	12.00±0.13	1.0984
		-	20 45 20	21 02 00	Decay	6.15±0.18	

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$- $00^h52^m18^s$	$21^h28^m12^s$- $21^h32^m00^s$
00 53 30 - 01 47 48	21 33 12 - 22 03 18
01 48 54 - 02 40 00	22 05 30 - 22 18 00
20 35 30 - 21 20 36	22 22 18 - 22 32 12
21 25 06 - 21 26 42	22 33 24 - 23 55 18

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
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V 1500 CYGNI (NOVA CYGNI 1975)

At the 90 cm telescope of the University Observatory Jena, Großschwabhausen outstation, photoelectric observations (UBV system) of Nova Cygni 1975 were taken. The photometer is equipped with a photomultiplier of the type RCA 1P21 (unrefrigerated) and the following Schott filters

u : UG 2 (1 mm)
b : BG 12 (1 mm) + GG 13 (2 mm), cemented
v : OG 4 (2 mm).

For main sequence stars the transformation of the instrumental colours to the standard ones is performed by the following equations (constant terms being dropped)

$$V = v - 0.012\ (B-V)$$
$$(B-V) = 0.917\ (b-v)$$
$$(U-B) = 1.007\ (u-b).$$

In view of the divergence mentioned below it should be noted that the excellent approximation of the V colour is confirmed by the comparison of the response curves of the V colour and the multiplier - filter - combination used for the present observations.

The results of the observations are collected in the Table. Most of the columns need no explanation. n gives the number of observations averaged to the magnitudes and colours in the preceding columns and Δt is the length of the corresponding time interval.

The main features, such as gradual decrease or increase in brightness during the night are apparent in the Table. Plots of the individual observations reveal no reliable short scale phenomena considerably exceeding the usual photoelectric accuracy.

Comparison of the present observations with results published in the Circulars of the International Astronomical Union shows agreement in B and U. The V magnitudes, however, are deviating from the long series by T.E. Margrave and J.H. Doolittle (IAU Circ. No.2839) and T.E. Margrave (IAU Circ. No.2853), for instance. This deviation starts with 1975, Sept. 3 and is in the sense that the Jena V magnitudes are fainter. It is due to the appearance in the spectrum of the Balmer series in emission.

Date		JD minus 244 2600	Comp. stars	V	(B-V)	(U-B)	n	t (min)
1975, Aug.	31.894	56.394	5,6	$2^{m}.20$	$0^{m}.62$	$-0^{m}.30$	2	2
	.954	.454		2.19	0.61	-0.31	2	2
Sept.	1.892	57.392	2,4,5,6	3.39	0.42	-0.42	2	3
	.916	.416		3.38	0.39	-0.45	2	10
	.929	.429		3.45	0.41	-0.42	2	11
	2.053	.553	2	3.58	0.40	-0.49	2	17
	.062	.562		3.60	0.39	-0.50	2	6
	2.861	58.361	1,2	4.36	0.33	-0.58	3	15
	.956	.456		4.40	0.31	-0.60	3	15
	3.009	.509		4.42	0.31	-0.60	3	15
	.046	.546		4.44	0.31	-0.60	3	12
	3.971	59.471	1	5.08	0.29	-0.60	3	18
	4.014	.514		5.13	0.30	-0.62	4	18
	5.940	61.440	7	5.68*	0.24*	-0.70*	1	-
	6.908	62.408	7	5.94**	0.21**	-0.64**	2	28
	8.862	64.362	9	6.27	0.19	-0.65	1	-
	.899	.399		6.36	0.17	-0.60	2	6
	.942	.442		6.45	0.16	-0.62	3	12
	.978	.478		6.39	0.16	-0.60	4	12
	9.017	.517		6.37	0.17	-0.59	3	17
	9.844	65.344	9,10	6.40	0.14	-0.60	3	10
	.865	.365		6.43	0.11	-0.61	2	7
	.938	.438		6.60	0.12	-0.59	3	13
	16.861	72.361	11,12	7.32	-0.10	-0.50	3	45
	.885	.385		7.26	-0.11	-0.48	2	8
	.930	.430		7.32	-0.10	-0.47	4	19
	17.846	73.346	11,12	7.35	-0.14	-0.45	3	19
	901	.401		7.39	-0.15	-0.46	2	9
	.935	.435		7.45	-0.12	-0.46	3	18
	.985	.485		7.44	-0.12	-0.48	2	11
	22.917	78.417	12	7.83	-0.25	-0.49	4	20
	.959	.459		7.84	-0.24	-0.49	2	4
Oct.	27.824	113.324	13	9.69	-0.60	-0.61	3	46
	.897	.397		9.62	-0.58	-0.59	2	26
	29.893	115.393	13,14	9.71	-0.53	-0.52	3	20
	30.806	116.306	14	9.76			2	5
	.819	.319		B= 9.15		-0.57	3	16
	.897	.397		9.83			3	16

* very low weight.

** low weight.

List of comparison stars:

1	55 Cygni
2	Tau Cygni
4	Nu Cygni
5	Gamma Cygni
6	Delta Cygni
7	BSC 8327
9	HD 200723 A
10	Cluster M 39 No. 26
11	" No. 1
12	" No. 5
13	" No. 4
14	" No. 20

The magnitudes and colours of the comparison stars were taken from the Arizona-Tonantzintla-Catalogue (Sky and Telescope 30, 25, 1965.), V.M. Blanco et al. (Publ. US Naval Obs., 2nd Ser., Vol. 21, 1968), and A.A. Hoag et al. (Publ. US Naval Obs., 2nd ser., Vol. 17. 7, 1961).

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THE PERIOD OF THE CEPHEID VARIABLE BD+56° 2806

The variability of the star BD+56° 2806 (=HD 239994) was discovered by Fernie and Hube (1971). The type of the light variation could not be determined on the basis of the observations. Nevertheless, this star was suspected to be a cepheid variable according to its location on the HR diagram.

Afterwards Percy (1975) reobserved this variable during six consecutive nights. The star showed short period small amplitude light variation with period about three days.

In order to determine a more correct value of the period, this star was observed in 1975-76. The observations were made in B and V colours close to the Johnson's system using the 24 in. and 20 in. telescopes of the Konkoly Observatory at Budapest and at the Piszkéstető Mountain Station, respectively. After transforming to the Johnson's system the magnitudes are totally independent of the telescope used.

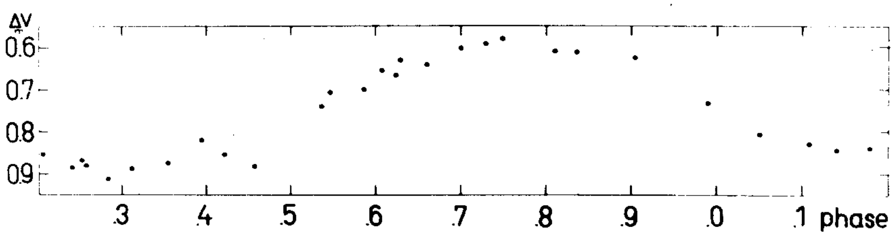
BD+56° 2815 was the comparison star. Its constancy was checked by the star BD+56° 2808. Their adopted magnitudes are as follow:

		V	B-V
comparison	BD+56° 2815	$8^m_.67$	$0^m_.15$
check	BD+56° 2808	9.38	0.11

The new observations made the determination of the period possible with accuracy of four decimal places. An improvement of the value of the period could be reached taking Percy's observations into account. The correct value of the period is $2^d_.80591$, thus the elements are:

$$\mathrm{Max}_{hel} = \mathrm{JD}\ 2442676.397 + 2^d_.80591 \cdot E$$

The observations are listed in the Table. The Figure shows the V light curve. The starting epoch of the phase computation is JD 2430000. The amplitude of the light variation in V is $0^m_.30$, and that of the B-V colour index is $0^m_.15$. The observed light curve is almost complete. Unfortunately, there are fairly few observations at the lower part of the rising branch, where one can suspect a small bump. The presence of the post-minimum bump seems to be a common feature of the small amplitude cepheids (Szabados 1976).



JD 2442000+	ΔV	Δ(B-V)	JD 2442000+	ΔV	Δ(B-V)
634.479	0.609	0.642	715.330	0.666	0.692
635.405	.845	.699	.433	.643	.662
636.519	.741	.662	720.376	.855	.739
639.355	.709	.705	728.315	.869	.823
640.358	.626	.677	738.372	.611	.648
642.393	.633	.689	743.344	.656	.734
645.477	.591	.642	756.239	.856	.815
646.379	.807	.646	767.190	.831	.700
669.406	.883	.794	770.195	.840	.791
675.413	.822	.791	776.185	.887	.827
676.397	.580	.682	.305	.875	.808
685.490	.733	.667	777.271	.602	.678
712.420	.700	.718	782.204	.882	.694
714.374	.912	.767	787.202	0.885	0.720

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References:

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NEW VARIABLE STARS FOUND IN GALACTIC CLUSTERS

The purpose of this note is to report the variability detected photoelectrically in fourteen stars located in the region of the following eight galactic clusters: Cr 132, Cr 140, Cr 228, Cr 240, Cr 367, NGC 3324, NGC 3590 and HOGG 10. All these clusters are being studied by the writer using wide-band (UBV) and narrow-band ($H\beta$) photometry. Observations of numerous stars in the region of all these clusters have been carried out during various observing runs in 1973-1975, using the 60-inch telescope of the Bosque Alegre Station of the Cordoba Observatory (Argentina) and the 24-inch Lowell and 36-inch telescopes of Cerro Tololo Inter-American Observatory (Chile). The observations were reduced using standard stars from the E-regions (1) and mean extinction coefficients. The external and internal mean errors of a single observation are about $0^{m}_{\cdot}01$ in all the cases. Among the new variables detected there are ten having V amplitudes greater than $0^{m}_{\cdot}10$ while the other four stars have ΔV variations in the interval $0^{m}_{\cdot}07 \leq V \leq 0^{m}_{\cdot}10$. Nine of the variable stars are undoubtedly cluster members, the remaining five being non-member field stars.

The individual UBV observations of the variable stars detected in the fields of galactic clusters are listed in Table I whose columns give in succession: (1) HD/CD number or author's number, (2) indication if the star is a member (m) or non-member (n-m) of the cluster, (3) source of reference for the two former columns, (4) spectral type taken from the literature (2,3,4) or when given in parenthesis as estimated from the intrinsic UBV colours, (5) heliocentric Julian Date, and (6-8) magnitude and colours in the UBV standard system. A finding chart for the two variable stars in Cr 228 is shown in Fig.1.

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Table I

Individual UBV Observations of the New Variables

Star	Membership	Ref.	Sp.type	HJD 2440000+	V	B-V	U-B
			Collinder 132				
HD 56161	n-m	5	G5 IV	2427.572	6.88	0.76	0.32
				2428.595	6.94	0.78	0.36
				2431.603	7.18	0.64	0.36
				2432.621	6.89	0.74	0.39
			Collinder 140				
HD 58535*	m	5	gK 2	1686.588	5.32	1.08	0.92
				1686.699	5.31	1.09	0.91
				1686.821	5.32	1.08	0.91
				1688.591	5.40	1.07	0.89
				1688.721	5.41	1.05	0.91
				1688.826	5.43	1.06	0.93
				1691.564	5.34	1.08	0.89
				1691.671	5.34	1.07	0.88
				1691.798	5.34	1.07	0.87
				1699.601	5.37	1.08	0.88
				1699.725	5.37	1.08	0.89
				1699.842	5.39	1.06	0.89
				1769.621	5.34	1.06	0.88
				1769.701	5.35	1.07	0.88
				1770.703	5.35	1.08	0.89
				2448.709	5.34	1.09	0.89
				2449.601	5.39	1.06	0.88
				2455.729	5.36	1.07	0.89
CD $-31^{\circ}4410$	n-m	5	-	2448.729	9.44	1.00	0.68
				2449.643	9.51	0.92	0.72
				2455.743	9.48	0.94	0.70
CD $-31^{\circ}4409$	m	5	(A7)	2448.688	10.26	0.19	0.16
				2449.676	10.22	0.22	0.19
				2455.779	10.29	0.24	0.18
				2456.762	10.26	0.22	0.17
			NGC 3324				
28	m	6	(B2.5 V)	2449.794	12.14	0.24	-0.46
				2450.800	12.34	0.22	-0.47
				2451.818	12.27	0.25	-0.44
				2452.818	12.21	0.24	-0.49
31	m	6	(B3 V)	2449.776	12.33	0.23	-0.43
				2450.781	12.33	0.23	-0.42
				2451.803	12.39	0.24	-0.41
				2452.800	12.40	0.24	-0.42
			Collinder 228				
12*	m	5	(B0)	1769.768	10.32	0.11	-0.73
				1770.831	10.33	0.08	-0.76
				2448.811	10.24	0.09	-0.76
36	n-m	5	-	1769.731	11.35	0.54	-0.02
				1770.801	11.43	0.54	0.03
				2448.796	11.28	0.58	0.06

Table I (continued)

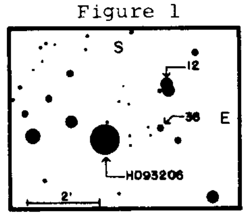
Star	Membership	Ref.	Sp.type	HJD 2440000+	V	B-V	U-B
			Hogg 10				
7	m	7	(B2.5 V)	2449.701	12.15	0.23	-0.52
				2450.711	12.30	0.25	-0.49
				2452.710	12.25	0.28	-0.47
13	m	7	(B6 V)	2449.720	13.22	0.32	-C.24
				2450.723	13.01	0.36	-0.20
				2452.733	13.11	0.34	-0.20
			Collinder 240				
HD 97151	n-m	7	B2 Ve	2458.700	7.59	-0.05	-0.83
				2459.728	7.70	-0.09	-0.80
				2460.725	7.65	-0.10	-0.80
				2462.731	7.64	-0.09	-0.82
HD 97013*	m	7	O9.5 III	2458.709	8.77	0.20	-0.53
				2459.716	9.02	0.25	-0.50
				2460.733	8.84	0.24	-0.48
				2462.739	8.88	0.24	-0.47
			NGC 3590				
22	n-m	7	-	2449.743	13.31	0.63	0.43
				2450.739	13.46	0.56	0.39
				2458.730	13.38	0.60	0.40
				2462.759	13.39	0.60	0.40
			Collinder 367				
CD -24°13962	m	5	O7.5nn	1897.635	7.34	0.12	-0.85
				1898.643	7.32	0.15	-0.86
				1899.659	7.29	0.14	-0.89
				1900.663	7.38	0.11	-0.87
				1920.703	7.45	0.11	-0.85
				1921.691	7.36	0.13	-0.86

HD 58535: IDS double star ($\rho=1\overset{''}{.}9, \Delta m=5.5$). Measures refer to A component.

Star 12 (Cr 228): This star was also considered to be a cluster member by Feinstein et al.(8).

HD 97013 : From a recent study by Clariá (7) it is suggested that the stars in the region of Cr 240 (=NGC 3572a) form an OB association rather than a cluster.

Figure 1



Finding chart for variables in Cr 228.

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Konkoly Observatory
Budapest
1976 March 3

AN URSAE MAJORIS AS AN ECLIPSING BINARY

Recently Kukarkin (1975) indicated that the novalike variable AN Ursae Majoris is an eclipsing binary of short period. A preliminary analysis of data obtained at Kitt Peak National Observatory appear to confirm this result. The star was monitored photoelectrically in blue light on three nights with the No. 2, 0.9-meter reflector. Four minima were observed at the times given below. The residuals, second column, are based on light elements that combine Kukarkin's value for the epoch with a somewhat shorter period,

$$\text{Min. J.D. hel.} = 2442502.285 + 0.1594205 \cdot E.$$

A more complete discussion is to be published.

JD hel 2442000 +	
805.9813	+0.0002
806.9378	+0.0001
807.7345	-0.0002
807.8938	-0.0003

G.S. MUMFORD

Tufts University
Medford, Mass. USA

Reference:
Kukarkin, B.V. 1975, Inf.Bull.on Variable Stars, No. 1039.

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1110

Konkoly Observatory
Budapest
1976 March 3

V1, THE ONLY KNOWN CEPHEID VARIABLE IN THE GLOBULAR CLUSTER NGC 6752; OBSERVATIONS AND PERIOD

The period ($1^d.37$) of this remarkable star was found independently by Lee (1) and by Wesselink (2) at about the same time. Lee's work was done at Siding Spring, Australia; Wesselink made use of plates taken at the Radcliffe Observatory, South Africa and of plates obtained at the Yale-Columbia Observatory in South America.

Since then 23 more South American plates of the star became available. This new material is in accord with the earlier results.

Table I gives the details of the B photometry done on South African material. Table II, similarly, gives the South American B results presently available.

TABLE I

South African Plates
(74-inch Radcliffe Reflector)

2430000 +	Ph	B	2430000 +	Ph	B
3539.30	.14	13.05	7433.58	.86	13.70
3895.34	.49	13.68	7433.59	.86	13.59
5364.24	.33	13.34	7845.53	.77	13.67
5366.27	.80	13.90	7847.45	.16	12.90
5366.29	.82	13.90	8172.60	.10	13.00
6456.22	.68	13.92	8172.62	.11	13.05
6697.64	.85	13.44	8172.63	.12	13.00
7198.23	.09	13.11	8172.64	.12	13.05
7198.26	.11	13.11	8230.47	.09	13.11

TABLE II

South American Plates
(20-inch Y - C Astrograph)

2440000 +	Ph	B	2440000 +	Ph	B
828.55	.27	13.11	1926.67	.08	13.07
829.55	.00	13.00	1926.69	.09	13.11
830.54	.72	13.72	1926.72	.11	13.00
832.56	.18	12.98	1926.75	.13	13.00
834.56	.63	13.74	1927.49	.67	13.81
835.55	.35	13.40	1927.52	.69	13.89
836.58	.10	12.92	1927.55	.71	13.89
854.55	.14	12.90	1927.58	.74	13.89
857.55	.31	13.22	1927.61	.76	13.89
858.55	.04	13.05	1927.64	.78	13.89
1897.67	.03	13.16	1927.67	.80	13.81
1926.50	.95	13.16	1927.70	.82	13.81
1926.52	.97	13.25	1927.73	.84	13.45
1926.55	.99	13.16	1927.76	.87	13.45
1926.58	.01	13.16	1948.50	.92	13.45
1926.61	.03	13.11	1949.52	.66	13.81
1926.64	.05	13.16			

The B magnitudes are on Lee's photometric system, allowing a direct comparison with the Lee photometry. Instead of the more accurate heliocentric values, geocentric Julian Dates have been given as being good enough.

The Australian, South African and South American data were used for a new discussion of the period.

It was found that the constant period $1^d.378156 \pm 0.000006$ (s.e.) gives a satisfactory representation of all the available observations over an interval of 23 years.

The corresponding reciprocal period is 0.725607 ± 0.000003 (s.e.)

The phases as given in Table I and Table II were calculated from the formula

$$\text{Phase} = 0.725607 \times (\text{JD} - 2430000)$$

Corresponding to this formula, the phase of maximum light is 0.16.

The new ephemeris is

$$\text{JD of maximum} = 2441000.67 + 1.378156 \times E$$

Future observations are needed to check the constancy of the period to higher accuracy.

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References:

Lee, S.W., The Observatory , Vol. 94, 74 (1974).

Wesselink, A.J., I.A.U. Inf. Bull. 895.

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Number 1111

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Budapest
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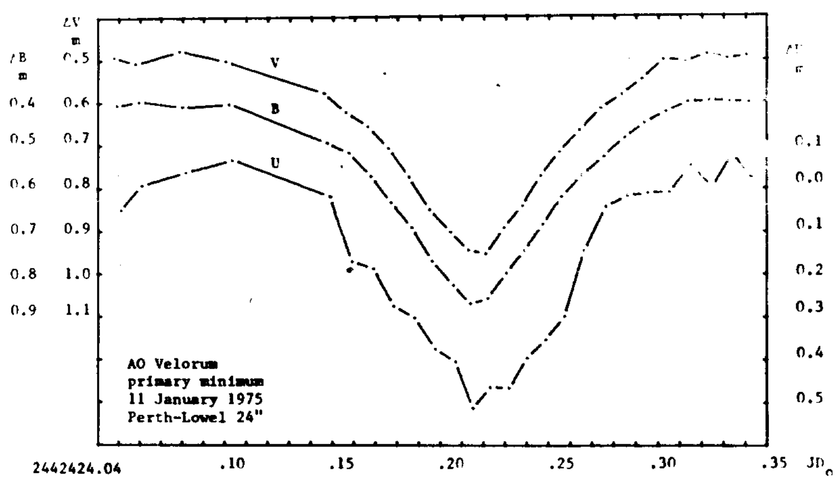
UBV PHOTOELECTRIC MINIMUM OF AO VELORUM

AO Velorum is an eclipsing variable star with large apsidal motion and it has been listed by Batten (1973) among stars deserving observational attention. AO Velorum or HD 68826 was observed during 5 nights with 60cm Lowel-Perth reflector at Perth Observatory in December 1974 and January 1975. The integrating photometer, described by Millis *et al.* (1974), was used with the standard UBV filters and EMI 6526S photomultiplier. During the observation the digital display of the photometer and digital display of universal time was written down. The standard procedure, comparison star - variable - comparison, etc., was used, the variable star being occasionally replaced by a check star. The integration time was 10 seconds and each measurement represents the average of at least 3 integrations. The time was recorded at the beginning of each set of readings and later reduced to the middle of the measuring interval (ranging from 30 to 50 seconds). The brightness of the sky background was read (3 readings) after the measurement with each filter. The flanking apertures were used for sky measurements. HD 68557 served as comparison star.

The reduced data in Table I represents time in heliocentric Julian Days and observed differential magnitudes in the sense variable star minus comparison star, linearly interpolated for the time of the measurement of the variable. The reduction of measured values was performed with the HP 1900 desk calculator (with extended memory HP 9101A) and both the measured values and the reduced data were plotted simultaneously on the HP 9125B calculator plotter. More details concerning the evaluation of the measurements may be found in a previous paper (Kvíz, 1975). Fig. 1 is direct output from the plotter.

The time of the minimum was computed according to Kwee and Van Woerden's (1956) method for the interval JD hel 2442424.15 - 2442424.28. The time of the minimum and the respective mean errors of the measurements with individual filters are in Table II.

I wish to express my appreciation of the help to the staff of Perth Observatory during my stay there. For assistance during observations I thank Mr. A Verveer and my wife J. Kvizová.



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References:

Batten, A.H. 1973, Binary and Multiple Systems of Stars, p. 138.
Kvíz, Z. 1975, Proc. Astr. Soc. Australia 2, 351.
Kwee, K.K. and van Woerden, H. 1956, Bull. Astr. Inst. Neth. 12, 327.
Millis, R.L. *et al.* 1974, Icarus 23, 425.

Table 1

UBV Photoelectric measurements of AO Velorum

JD_o 2440000. +	ΔV		ΔB		ΔU
2408.1017	+0.495	2408.1030	+0.400	2408.1043	-0.030
1114	+0.484	1126	+0.392	1142	-0.096
1298	+0.504	1310	+0.416	1321	-0.029
1389	+0.504	1402	+0.391	1415	-0.090
1487	+0.500	1500	+0.402	1511	-0.039
1578	+0.486	1590	+0.406	1602	-0.036
1683	+0.505	1695	+0.384	1708	-0.027
1776	+0.481	1790	+0.388	1803	-0.009
1897	+0.486	1908	+0.396	1920	-0.063
1992	+0.533	2007	+0.406	2020	-0.020
2102	+0.490	2116	+0.398	2129	-0.112
2207	+0.490	2223	+0.404	2236	-0.034
2310	+0.495	2322	+0.403	2334	-0.093
2407	+0.485	2419	+0.401	2435	-0.067
2507	+0.498	2521	+0.398	2533	-0.035
2606	+0.496	2620	+0.409	2632	+0.008
2711	+0.501	2727	+0.406	2740	+0.014
2814	+0.513	2829	+0.420	2842	-0.008
2918	+0.538	2932	+0.445	2948	+0.059
3032	+0.571	3045	+0.494	3057	+0.057
3140	+0.624	3154	+0.544	3166	+0.125
3239	+0.666	3252	+0.593	3262	+0.162
3335	+0.730	3346	+0.649	3357	+0.256
2410.0475	+0.498	2410.0489	+0.415	2410.0502	+0.038
0563	+0.494	0576	+0.413	0589	-0.024
0652	+0.496	0666	+0.411	0679	-0.034
0834	+0.504	0848	+0.407	0860	-0.057
0921	+0.505	0932	+0.412	0945	-0.061
2416.0270	+0.487	2416.0283	+0.395	2416.0297	-0.036
0365	+0.529	0376	+0.392	0389	-0.043
0544	+0.503	0555	+0.400	0566	-0.017
0627	+0.488	0639	+0.400	0650	-0.020
2423.1892	+0.485	2423.1909	+0.382	2423.1926	-0.114
2027	+0.498	2043	+0.390	2057	+0.020
2147	+0.477	2161	+0.394	2177	-0.042
2273	+0.498	2286	+0.408	2303	-0.020
2415	+0.498	2430	+0.400	2444	+0.052
2528	+0.488	2541	+0.396	2554	-0.097
2654	+0.510	2668	+0.404	2683	-0.082
2782	+0.500	2800	+0.399	2817	0.000
2918	+0.501	2933	+0.406	2946	+0.016
3033	+0.507	3050	+0.403	3064	-0.011
3153	+0.510	3167	+0.403	3183	-0.018
3269	+0.505	3284	+0.402	3301	+0.043

Primary Minimum

	ΔV		ΔB		ΔU
2424.0475	+0.492	2424.0489	+0.405	2424.0509	+0.050
0580	+0.508	0595	+0.396	0610	-0.009
0787	+0.477	0801	+0.410	0817	-0.040
1004	+0.502	1021	+0.401	1036	-0.068
1461	+0.578	1475	+0.495	1488	+0.019
1564	+0.624	1577	+0.519	1590	+0.171
1666	+0.657	1679	+0.573	1691	+0.188
1759	+0.707	1771	+0.634	1786	+0.276
1855	+0.775	1869	+0.692	1882	+0.304
1950	+0.850	1962	+0.771	1976	+0.376
2048	+0.903	2059	+0.827	2071	+0.406
2131	+0.945	2141	+0.871	2152	+0.514
2211	+0.954	2221	+0.857	2232	+0.464
2296	+0.892	2307	+0.797	2319	+0.468
2380	+0.841	2391	+0.745	2402	+0.395
2465	+0.771	2476	+0.684	2488	+0.352
2549	+0.715	2562	+0.619	2575	+0.299
2643	+0.665	2653	+0.570	2664	+0.146
2741	+0.615	2754	+0.527	2766	+0.044
2838	+0.582	2850	+0.483	2862	+0.018
2927	+0.546	2940	+0.448	2955	+0.011
3026	+0.500	3038	+0.422	3053	+0.011
3124	+0.506	3138	+0.400	3152	-0.053
3223	+0.488	3235	+0.397	3250	0.000
3317	+0.499	3329	+0.399	3341	-0.078
3405	+0.491	3416	+0.402	3428	-0.025

Table II

Time of Minimum

Filter	T min		σ
V	2424.2159	±	.0003
B	.2162	±	.0003
U	.217	±	.002

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Konkoly Observatory
Budapest
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OBSERVATIONS OF YZ CANIS MINORIS - NOVEMBER AND DECEMBER 1975

During November and December 1975, observations were carried out at Boyden Observatory of the flare star YZ Canis Minoris (R.A. 7^h42^m, decl. $3^\circ 39'$ (1968.0), visual magnitude 11.6).

The 41 cm Nishimura reflector was used for this work, with a Johnson B. filter and a cooled EMI6256A photomultiplier tube as the detector.

The total monitoring time was $33^h46^m12^s$. During this time nine flares were recorded. Of particular interest is the flare event which occurred on the 7th December. The $\frac{I_{o+f}-I_o}{I_o}$ value was particularly large, viz. 16.30. This was preceded by a flare of $\frac{I_{o+f}-I_o}{I_o}$ value 2.72 a few minutes earlier. This activity was undoubtedly a single event in that the slow decay continued for the rest of the night.

A.H. JARRETT and J.B. GIBSON

Boyden Observatory, Department of Astronomy, University of the Orange Free State, Bloemfontein. Republic of South Africa.

YZ CMi - NOVEMBER AND DECEMBER 1975

Date	Total Hours	Rise	Max. (U.T.)	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
27th Nov.	$1^h44^m42^s$						
Monitoring Times (U.T.)							
$22^h13^m06^s$ - $22^h33^m30^s$							
22 35 42 - 24 00 00							
28th	$3^h13^m00^s$	$22^h23^m56^s$	$22^h23^m57^s$	$22^h24^m18^s$	Flare	0.46 ± 0.07	1.7438
		22 43 11	22 43 15	22 45 42	Flare	0.98 ± 0.14	1.6017
Monitoring Times (U.T.)							
$00^h00^m00^s$ - $00^h20^m24^s$							
00 27 36 - 02 10 12							
22 07 12 - 23 17 12							
29th	$1^h50^m48^s$	22 14 00	22 14 18	22 14 42	Slow flare	0.40 ± 0.11	1.7935
Monitoring Times (U.T.)							
$22^h05^m00^s$ - $23^h08^m42^s$							
23 12 54 - 24 00 00							
30th	$2^h35^m48^s$						
Monitoring Times (U.T.)							
$00^h00^m00^s$ - $00^h20^m54^s$							
00 22 06 - 01 25 42							
01 33 12 - 02 17 54							
22 07 00 - 22 33 36							
1st Dec.	$1^h09^m36^s$						
Monitoring Times (U.T.)							
$22^h48^m54^s$ - $22^h52^m30^s$							
22 54 00 - 24 00 00							
2nd	$3^h56^m06^s$	$00^h36^m15^s$	$00^h36^m28^s$	$00^h37^m48^s$	Probably a flare	0.63 ± 0.06	1.2067
Monitoring Times (U.T.)							
$00^h00^m00^s$ - $01^h01^m18^s$							
01 07 54 - 02 09 54							
22 07 12 - 24 00 00							

Table (cont.)

Date	Total Hours	Rise	Max. U.T.	Ends	Comments	$\frac{I_{o+f}-I_o}{I_o}$	Air Mass Max.
3rd	$3^h53^m48^s$	$00^h20^m51^s$	$00^h21^m09^s$	$00^h22^m00^s$	Flare	0.58±0.11	1.2194
		01 53 18	01 53 47	01 57 00	Slow flare	0.53±0.11	1.2073
		22 22 24	22 22 26	22 22 39	Possibly a flare	0.41±0.09	1.6092
<u>Monitoring Times</u> (U.T.)							
$00^h00^m00^s$- $00^h39^m06^s$							
00 42 18 - 01 02 48							
01 06 54 - 02 08 00							
22 06 54 - 24 00 00							
4th	$2^h01^m54^s$						
<u>Monitoring Times</u> (U.T.)							
$00^h00^m00^s$- $00^h01^m48^s$							
00 03 48 - 01 01 36							
01 05 42 - 02 08 00							
6th	$1^h24^m30^s$	23 03 41	23 03 42	23 03 52	Probably a spike	0.67±0.09	1.3564
<u>Monitoring Times</u> (U.T.)							
$22^h35^m30^s$- $24^h00^m00^s$							
7th	$4^h06^m48^s$	00 35 00	00 36 02	-	Flare	2.72±0.14	1.1926
	One event	00 36 52	00 38 05	-	Flare	16.30±0.12	1.1916
		01 28 12	01 29 18	01 29 48	Slow flare	1.44±0.11	1.1996
		01 30 54	01 31 18	01 31 48	Slow flare	1.11±0.11	1.2012
<u>Monitoring Times</u> (U.T.)							
$00^h00^m00^s$- $01^h14^m36^s$							
01 19 30 - 02 18 00							
22 06 18 - 24 00 00							
8th	$4^h00^m24^s$	23 14 04	23 14 05	23 14 18	Possibly a small flare	0.40±0.08	1.3023
<u>Monitoring Times</u> (U.T.)							
$00^h00^m00^s$- $00^h43^m48^s$							
00 48 06 - 02 10 00							
22 05 18 - 24 00 00							
9th	$3^h48^m48^s$	02 00 48	02 00 50	02 00 54	Possibly a small flare	0.41±0.06	1.2503
		02 01 14	02 01 20	02 01 42	Possibly a flare	0.64±0.11	1.2511

Table (cont.)

Date	Total Hours	Rise	Max. U.T.	Ends	Comments	$\frac{I_o+f-I_o}{I_o}$	Air Mass Max.

<u>Monitoring Times</u> (U.T.)

$00^h00^m00^s$ - $00^h35^m12^s$
00 39 06 - 02 08 06
22 13 24 - 23 58 00

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Number 1113

Konkoly Observatory
Budapest
1976 March 9

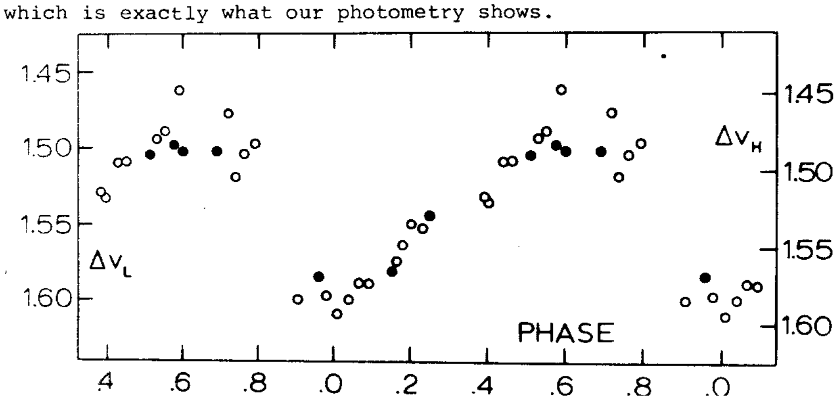
BS 1099: A BRIGHT VARIABLE SIMILAR TO THE RADIO STAR UX ARIETIS

Photoelectric observations of BS 1099 (= ADS 2644 AB = CSVS 6039) have shown it to be a variable. We (along with Larry P.Lovell at the Hickox Observatory in Chagrin Falls, Ohio) plan to continue observing this variable until it sets and then publish our observations together elsewhere.

Between JD 2,442,748.5 and JD 2,442,808.5 Landis obtained 21 observations with his 10-inch (25-cm) Newtonian reflector, and between JD 2,442,816.5 and JD 2,442,831.5 Hall obtained 7 with the 24-inch (60-cm) Seyfert reflector of the Dyer Observatory. Both observers used a visual filter, included both components of the visual binary system, and used 10 Tauri as a comparison star. Extra-terrestrial instrumental differential magnitudes are plotted in the Figure, where the $0\overset{m}{.}015$ shift between those of Landis (Δv_L) and those of Hall (Δv_H) allows for the difference in transformation to the UBV system. Phase is computed with the ephemeris

$$JD\ (hel.) = 2,442,770.65 + 2\overset{d}{.}822\ E$$

for minimum light. The UBV photometry of Cousins (1963) made him suspect that BS 1099 was a variable with an amplitude of $\Delta V = 0\overset{m}{.}11$, which is exactly what our photometry shows.



We are extremely grateful to Dr. Bernard W. Bopp for drawing our attention to the fact that BS 1099 resembles UX Arietis spectroscopically. According to him it shows a pronounced H and K reversal similar to that seen in other RS CVn-type binaries and it seems to be a spectroscopic binary with an orbital period in the neighborhood of 3 days. Now, comparing our Figure with Figure 1 of Hall, Montle, and Atkins (1975), we see also that the light curves of BS 1099 and UX Ari are amazingly similar.

The radio astronomers will want to look for radio emission similar to that found emanating from UX Ari (Gibson, Hjellming and Owen 1975), since BS 1099 is brighter than UX Ari and even brighter than AR Lacertae. In fact, BS 1099 seems to be the brightest RS CVn-type binary known to date (Hall 1976).

In a recent phone conversation Dr. Bopp has just told us that his April-December 1975 spectroscopic observations have yielded an orbital period of $2\overset{d}{.}8379 \pm 0\overset{d}{.}0003$.

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References:

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W UMa:A NEW PERIOD VARIATION

The behaviour of the period of W UMa is known to be subjected to fast and slow variations (Cester, 1969). The last one occurred in 1969-70 with a reduction of the period (Cester,Pucillo 1972). Observations of some minima made in 1974 and 1975 suggested the possibility of a new lengthening: this was briefly communicated in the Bibliography on Close Binaries 25. New observations made at the end of this February confirm the variation, as it can be seen from the positive residuals referred to the elements valid since 1970: Min.I=J.D.2441004.39769+0.33363696 E. All times were deduced after Kwee and van Woerden method.

Hel.J.D. 2442000 +	m.e.	O-C
101.39680	± 0.00003	+0.00079
120.41352	.00006	+0.00020
451.38263	.00009	+0.00145
462.39281	.00005	+0.00160
830.39480	.00008	+0.00203
830.39409	.00004	+0.00132
831.39608	.00014	+0.00240
835.39900	.00005	+0.00167
835.39900	.00003	+0.00167
836.39998	.00003	+0.00174
837.40109	.00003	+0.00194
839.40306	.00008	+0.00209

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References:
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Budapest
1976 March 18

CSV 8871

CSV 8871 = BV 324 was discovered by Strohmeier, and announced as an eclipsing binary ($11^m_.9$ - $12^m_.5$ ph)(Veröff. Remeis-Sternwarte Bamberg, Bd. V, 5. 1960).

I examined this star on 144 sky patrol plates of the Bruno-H.-Bürgel-Observatory Hartha (JD.2436985-42741) and found that the star was of β Lyrae-type with following preliminary elements:

Min.(hel.) = JD. 2437017.434 + $1^d_.5146774 \cdot E$ (EB)

($11^m_.26$ - $11^m_.91$ / $11^m_.88$ ph)

Observed minima:

Min.(hel.) 24...	Epoch	O-C	
37017.434	0	±0.000	
045.410	+ 18.5	- .046	(n=2)
39027.430	1327	+ .019	
033.483	1331	+ .013	
389.404	1566	- .015	
41596.301	3023	- .003	
599.333	3025	± .000	(n=2)
958.308	3262	- .004	
42036.310	3313.5	- .008	

Further particulars will be published in "Mitteilungen der Bruno-H.-Bürgel-Sternwarte Hartha".

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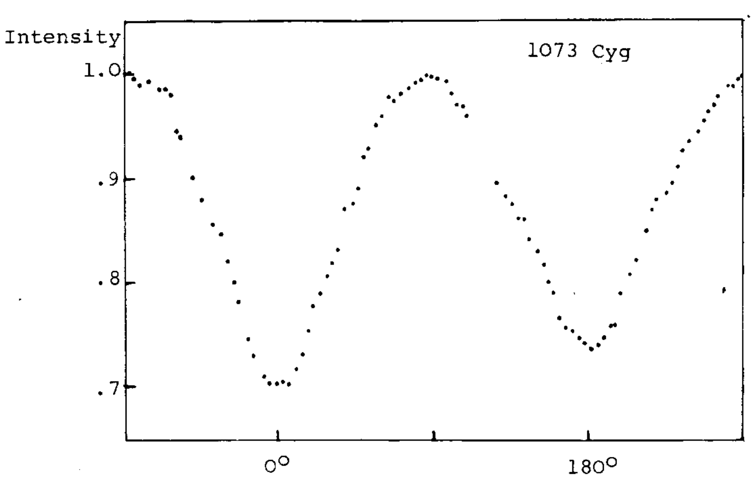
Konkoly Observatory
Budapest
1976 March 22

PHOTOMETRY OF ECLIPSING BINARY 1073 Cyg

The star 1073 Cyg (BV 342) was first reported as a variable, by W. Strohmeier in 1960. In this binary interaction effects make the light curve difficult to solve. Two independent sets of photoelectric observations were obtained by Y. Kondo (1966, A.J. 71, 54) and by O. Bindinelli, S. Catalano, S. Cristaldi and C. delli Ponti (1967, Publ. Catania, N.S.,113). The solutions adopted by the authors mentioned above are similar.

During September and October 1975, photoelectric observations of 1073 Cyg were made with the 50 cm Cassegrain reflector of the Astrophysical Section of the Bucharest Observatory. The telescope is equipped with an uncooled EMI 6502 B photomultiplier tube. 614 individual points in integral light were obtained. As comparison star, BD 32°4160 was used.



Observed light curve (normal points)

The list below contains minima of 1073 Cyg with the timings reduced by the tracing paper method; the elements given in GCVS 3 (2nd suppl.) were used for O-C computations.

Min.Hel.	E	O-C	Observer
2442660.4276	5074.5	+0.0010	Al.Dumitrescu
662.3880	5077	-0.0033	Al.Dumitrescu
671.4289	5088.5	+0.0002	R.Dinescu

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1117

Konkoly Observatory
Budapest
1976 March 22

BV PHOTOMETRY OF BM Cas

The long period eclipsing binary BM Cas ($P=197\overset{d}{.}28$) is of considerable interest, especially since Thiessen (1956) has sugseted that one component of the system is a classical Cepheid ($P=27^d$).

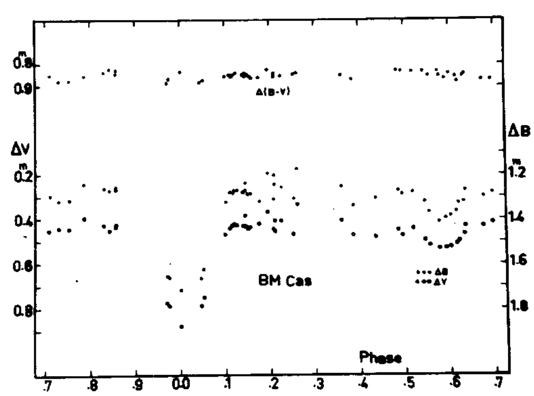
The two-colour photoelectric observations were obtained with the Ege University Observatory 48 cm Cassegrain telescope and an unrefrigerated 1P21 photomultiplier. The observations were made from February 1972 to May 1973, on 49 nights. BD+63°101 was used as comparison star. The differential magnitudes were corrected for differential extinction. The phases were calculated with the light elements given by Beyer (1952-1964);

$$\text{Hel.Min.I} = \text{J.D. } 2425\,772.9 + 197\overset{d}{.}28\cdot E + 2\overset{d}{.}6 \sin(7\overset{\circ}{.}11\cdot E+104^\circ).$$

The results are given in the Table, where the columns list the heliocentric Julian date, V and (B-V), respectively.

The light and colour curves are shown in the figure, where the instrumental magnitude differences between the variable and the comparison star have been plotted against the phases.

This study is a part of research project No.76 supported by the Scientific and Technical Research Council of Turkey.



Table

Differential BV Magnitudes

(BM Cas minus BD + $63^{\circ}101$)

J.D.(Hel.) 2441000+	ΔV	(B-V)	J.D.(Hel.) 2441000+	ΔV	(B-V)
356.2249	0.882	0.836	573.2761	0.476	0.845
365.2370	.785	.880	575.2586	.435	.853
366.2347	.745	.878	.2648	.443	.852
.2429	.760	.870	.2694	.455	.838
384.3967	.385	.853	576.3255	.433	.859
394.2550	.364	.930	.3318	.430	.857
.2613	.368	.829	.3383	.428	.849
.2672	.373	.827	577.2488	.427	.838
.2738	.372	.816	.2555	.427	.843
397.2397	.415	.822	.2613	.422	.868
.2438	.400	.867	578.2743	.431	.838
.2505	.405	.853	.2806	.446	.828
.2592	.410	.813	.2882	.419	.860
.2660	.405	.848	.2944	.416	.853
400.2519	.407	.853	581.2958	.435	.851
407.2678	.335	.840	.3027	.425	.850
478.5521	.450	.872	.3092	.435	.844
.5468	.435	.887	.3168	.432	.846
.5568	.462	.880	582.2688	.432	.844
481.4039	.437	.833	.2770	.427	.844
.4116	.434	.863	.2820	.432	.839
.4172	.424	.839	.2877	.437	.834
489.5452	.430	.870	583.4129	.450	.835
493.5123	.418	.868	.4203	.440	.855
.5183	.411	.870	.4300	.445	.850
.5249	.411	.870	.4371	.445	.840
499.5386	.436	.882	.4441	.440	.845
.5441	.439	.882	584.4190	.440	.845
.5497	.446	.872	.4280	.440	.850
504.5509	.437	.875	.4342	.430	.867
.5575	.441.	.876	588.2449	.467	.859
510.5257	.388	.854	.2505	.457	.864
.5330	.398	.854	.2567	.462	.854
.5407	.403	.849	.2626	.462	.869
519.5586	.415	.845	594.4931	.448	.866
.5670	.435	.830	.4993	.453	.856
524.5422	.440	.840	.5060	.438	.871
.5478	.435	.855	.5127	.443	.859
.5531	.435	.845	603.2470	.454	.846
547.3099	.779	.896	.2709	.471	.853
.3157	.774	.871	.2771	.476	.837
.3216	.774	.881	604.2466	.456	.859
548.2759	.794	.867	.2532	.450	.849
.2823	.789	.847	.2585	.455	.865
.2880	.779	.872	624.2283	.418	.846
.2935	.794	.882	.2326	.409	.840
572.2866	.491	.864	.2368	.387	.871
.2932	.486	.844	639.5686	.464	.850
573.2631	.461	.860	.5738	.481	.833
.2698	.471	.860	.5792	.497	.804

Table (continued)

J.D.(Hel.) 2441000+	ΔV	(B-V)	J.D.(Hel.) 2441000+	ΔV	(B-V)
649.2809	0.446	0.804	670.2644	0.530	0.871
.2879	.452	.852	672.2398	.560	.825
.2961	.444	.820	.2526	.550	.835
.3040	.455	.822	.2600	.525	.870
.3111	.445	.838	675.1744	.505	.870
651.2475	.470	.834	.1810	.510	.865
.2555	.452	.831	.1898	.515	.837
.2634	.452	.834	678.2610	.485	.855
.2680	.449	.832	.2690	.460	.848
655.5133	.435	.836	.2759	.462	.858
.5206	.452	.833	693.2451	.446	.846
.5265	.447	.836	.2518	.446	.856
660.5180	.493	.847	.2562	.453	.849
.5257	.484	.828	719.3979	.455	.820
.5317	.503	.822	.4045	.445	.830
663.3224	.518	.853	.4104	.450	.820
.3276	.516	.853	722.3278	.445	.818
667.3059	.535	.880	.3346	.432	.833
.3132	.530	.885	.3400	.440	.815
.3205	.535	.880	.3448	.405	.845
670.2378	.540	.856	826.5073	.460	.877
.2499	.535	.853	.5129	.476	.867
.2576	.525	.881	.5178	.484	.868

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References:

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CORRECTION TO I.B.V.S. No. 1113

"10-inch (25 cm)" should be read "8-inch (20 cm)"

D.S. HALL and
H.J. LANDIS

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
1976 March 23

PHOTOELECTRIC B, V PHOTOMETRY OF AI Hya

The variability of the system (BD+00°2259) was discovered by Hoffmeister (1934). The photographic magnitude of the star varies from $9^m.0$ to $9^m.5$. The star was classified as a typical Algol type eclipsing variable by Hoffmeister. Later on four minima and light curve of the star were photographically obtained by Lause (1938). His light elements were

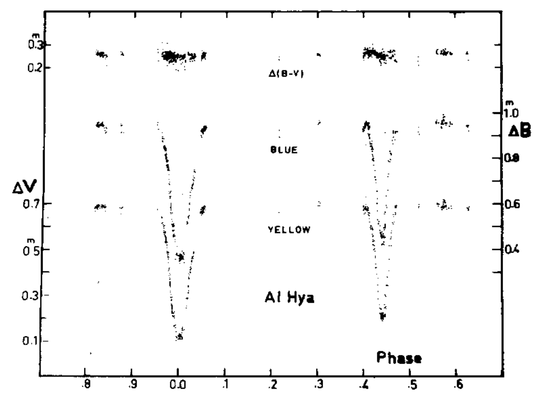
$$\text{Hel. Min.I.} = \text{J.D. } 2428\ 935.46 + 8^d.29 \cdot E$$

and distance between primary and secondary minimum, in units of time, was $3^d.61$. According to Popper (1972) spectroscopic observations do not agree with the above period and the period must be shorter than this value. For this purpose Popper has suggested to obtain the light curve of the system photoelectrically.

The star was photoelectrically observed between February 1972 and February 1973 on 17 nights with the 48 cm Cassegrain telescope of the Ege University Observatory using an RCA 1P21 photomultiplier and B,V filters. BD+00°2261 was used as comparison star and 320 observational points were obtained in each colour. The star has a long period and for this reason only a minimum could be obtained on 1972 April 3/4. There is a 13 hours difference between this minimum and the calculated minimum time with Lause's light elements. The new light elements could not be calculated due to the lack of available minima. Then the observed minimum time is taken as T_o and used the period given by Lause for the calculation of phases:

$$\text{Hel.Min.I.} = \text{JD } 2441\ 411.368 + 8^d.29 \cdot E.$$

The light and colour curves are presented in the Figure, where the magnitude differences between the comparison and the variable star have been plotted against the phases. The star varies about $0^m.590$ and $0^m.575$ at the primary, $0^m.500$ and $0^m.490$ at the secondary minimum in blue and yellow light, respectively. The secondary minimum is really displaced from phase 0.5 and the form of the light curve represents a typical Algol type curve as mentioned by Hoffmeister.



This study is a part of research project No.76 supported by the Scientific and Technical Research Council of Turkey.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1119

Konkoly Observatory
Budapest
1976 March 24

PHOTOELECTRIC MINIMA OF ECLIPSING BINARIES

The following Table I gives photoelectric minima of 8 eclipsing binaries observed by J.M. Kreiner with the 50 cm Cassegrain-telescope at the Fort Skala Observatory in Cracow. The successive columns contain the name of the star, filter used, the date, heliocentric time of minimum with its mean error, the number of observations (n), O-C computed from the elements published in "Rocznik Astronomiczny Obserwatorium Krakowskiego for the Year 1976"(No.47) and remarks. The times of minima with their mean errors were computed by H.Brancewicz using the method of Kwee and Van Woerden (B.A.N. 12, 327,1956).

Table I

Star	Filter	Date 1975	J.D. hel. 2400000+	n	O-C	Remarks
XZ And	V	Nov.25	42742.2476±.0046	26	-.0140	sec.
VW Cep	V	Oct.30	42716.3028±.0018	31	+.0101	
VW Cep	B	Oct.30	42716.3025±.0024	28	+.0098	
CW Cep	V	Aug.28	42653.4117±.0029	14	+.0626	sec.
CW Cep	B	Aug.28	42653.4007±.0068	14	+.0516	sec.
CW Cep	U	Aug.28	42653.4069±.0013	14	+.0578	sec.
Y Cyg	V	Sep.10	42666.3514±.0008	33	+.0127	sec.
Y Cyg	B	Sep.10	42666.3550±.0016	36	+.0163	sec.
BR Cyg	V	Aug.28	42653.4855±.0024	19	-.0035	
BR Cyg	B	Aug.28	42653.4880±.0005	17	-.0010	
V 836 Cyg	V	Aug.28	42653.4506±.0019	15	+.0014	
V 836 Cyg	B	Aug.28	42653.4511±.0011	15	+.0019	
V 836 Cyg	U	Aug.28	42653.4503±.0020	15	+.0011	
UX Her	-	Aug.27	42652.3636±.0004	46	-.0083	
AK Her	V	Sep.9	42665.3091±.0009	17	+.0004	
AK Her	B	Sep.9	42665.3092±.0010	18	+.0005	

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1120

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Budapest
1976 April 2

THREE-COLOUR PHOTOGRAPHIC PHOTOMETRY OF V 1057 CYGNI

According to a program of investigation of flare stars and other nonstable objects in the 16 square degrees region of Cygnus ($RA_{1950}=20^h52^m$; $D_{1950}=+42^o40'$) a great number of u, pg and some b, v patrol plates were taken between 1972 August 4 and 1974 August 30 (1121 days) with the 40 inch/50 inch and 21 inch/21 inch telescopes of the Byurakan Astrophysical Observatory.

On 89 of our plates we measured the magnitudes of V 1057 Cyg in u, b (pg) and v colours and compared them with the results of Gieseking (1) obtained for the period 1970-1975.

In order to obtain a good approximation to the UBV system we used the following telescope and plate-filter combinations:

u - 40 in. telescope, Kodak 103aO or ZU-2 + Schott UG2 or UG1
b - 40 in. telescope,Kodak 103aO or ZU-2 + Schott GG13
pg - 21 in. telescope, Kodak 103aO or ZU-2 without filter
v - 40 in. telescope, Kodak 103aD + Schott GGII

Our investigation (2) shows that the used u,b,v system is a good approximation of Johnson's photographic system and that pg-magnitudes are equal to b.

The measurements were carried out with an "ASKANIA" irisphotometer. Characteristic curves were derived for each plate using a group of 5 stars of photoelectric UBV - standard of Bigay and Garnier (3) and 7 stars of our secondary UBV photographic standard in the region of IC 5070 according to (2).

As in this region the background is very inhomogenous the iris readings for V 1057 Cyg were corrected according to the method of Argue (4). The nebula around V 1057 Cyg influenced our measurements in the sense that our u,b (pg), v magnitudes of this star were systematically brighter.

The results of our three-colour photographic photometry are given in the Table.

In the Figure we present the light curve of V 1057 Cyg in three colours.With dots and solid lines are presented our u,b(pg),

J.D.244...	v	b/pg	u	J.D.244...	v	b/pg	u
1534,28			12,05	2251,42		11.78	
1537,30		10,90pg		2251,43		11,60	
1538,43			12,03	2251,44		11,67	
1547,42			11,98	2251,49			12,61
1550,46		11,06pg	12,07	2252,38			12,79
1567,24			11,95	2252,42			12,74
1597,30		11,00pg		2254,37			12,73
1621,17			11,95	2254,40			12,76
1631,19		11,01pg		2254,49			12,70
1810,46		11,32pg		2255,30			12,68
1843,47		11,46pg		2269,28		11,80	
1860,40			12,67	2272,31	10,03		
1866,43		11,52		2272,47			12,83
1868,41			12,62	2273,30			12,68
1888,30		11,52		2273,33			12,90
1889,42			12,42	2273,36			12,69
1891,26			12,70	2275,30		11,68	
1891,31			12,55	2275,31	10,13		
1893,50			12,66	2278,47			12,87
1914,29			12,39	2279,33			12,71
1919,34			12,65	2299,30			12,89
1920,33			12,40	2300,31			12,70
1921,29			12,32	2304,32		11,70pg	
1922,24			12,65	2312,40		11,85pg	
1923,32		11,28		2331,25		11,88pg	
1923,34		11,30		2337,21		11,87pg	
1923,42			12,55	2337,22			13,08
1925,31			12,45	2337,30			13,11
1927,48	9,90			2339,18			13,12
1946,26		11,28		2339,23			13,03
1946,30			12,59	2622,29	10,04		
1947,41	9,80			2628,35			13,16
1949,29		11,42pg		2628,38		11,90	
2162,54	9,95			2628,39		11,95	
2222,48		11,61		2628,40	10,15		
2223,48			12,56	2631,30			13,08
2225,38			12,78	2631,40		11,80	
2240,34			12,85	2631,41	10,05		
2242,28			12,65	2652,22	10,22		
2242,38			12,62	2652,23		11,80	
2247,40	10,02			2652,25			13,20
2247,40	9,92			2655,34	10,21		
2247,45	10,07			2655,35		11,83	
2250,50			12,68	2655,36			13,12
2251,42		11,53					

v measurements, with crosses and dashed lines - the data of Gieseking obtained in the period 1972-1973, according to (1).

The slopes of the brightness decrease per 100 days in the time interval 1973-1975 are:

for u - $0^m.080 \pm 0^m.009$

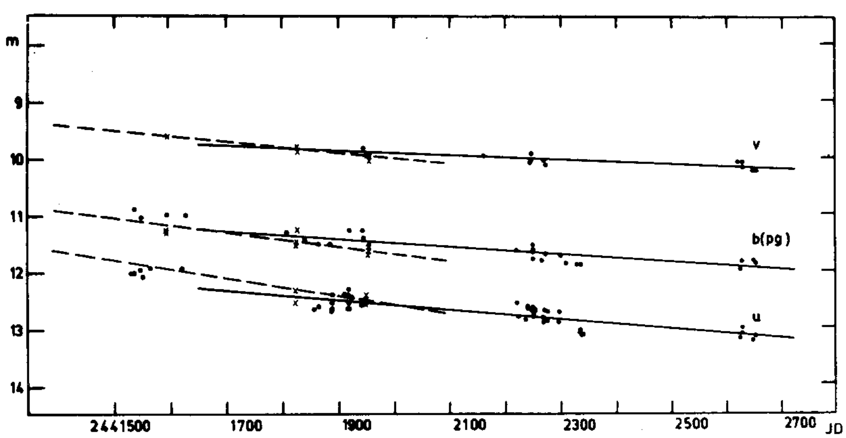
for b - $0^m.066 \pm 0^m.008$

for v - $0^m.038 \pm 0^m.008$

For the time interval of 750 days (from JD = 2441900 to JD= 2442650) we get the following changes of v and colours (u-b) and (b-v):

v = $0^m.3$; (b-v) = $0^m.2$; (u-b) = $0^m.1$

From the Figure it can be seen that, starting from the summer 1973, the slope diminished approximately twice.



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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1121

Konkoly Observatory
Budapest
1976 April 5

MINIMA OF RW PERSEI

In I.B.V.S. No. 910 Baldwin published a note about the period increase in RW Per and needed times of minima in order to confirm his result.

Hall and Stuhlinger confirmed the change in the period.

I examined the star on 229 Sky Patrol Plates of the Sonneberg Observatory (JD. 2437668-41683) and obtained 13 times of minima. (O-C) values calculated with the elements published by Baldwin are given in the Table.

Min.(hel.) 243...	Epoch	O-C
7730.600	+ 645	$+0^{d}.010$ ph
902.201	658	+ 024
8060.602	670	+ 038
9063.736	746	+ 053
380.494	770	+ 036
538.831	782	- 014
776.479	800	+ 053
40317.612	841	+ 029
858.729	882	- 010
924.751	887	+ 017
1056.712	897	- 011
333.932	918	+ 031
650.663	942	- 012

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1122

Konkoly Observatory
Budapest
1976 April 5

CHANGES IN THE PERIOD OF XZ ANDROMEDAE

One of the hypotheses explains changes in the period of XZ And by the motion of apsidal line (cf. Todoran, 1967). Unfortunately, there are some difficulties in the determination of accurate times of secondary minima which are very shallow. Only photoelectrical observations are useful for this purpose.

Table 1 contains the times of secondary minima obtained from photoelectrical observations published by Blitzstein (1954) and Reinhardt (1967). The last minimum was observed by the writer with the 50 cm Cassegrain-telescope of the Astronomical Observatory in Cracow. The values of O-C and E was computed from the linear elements:

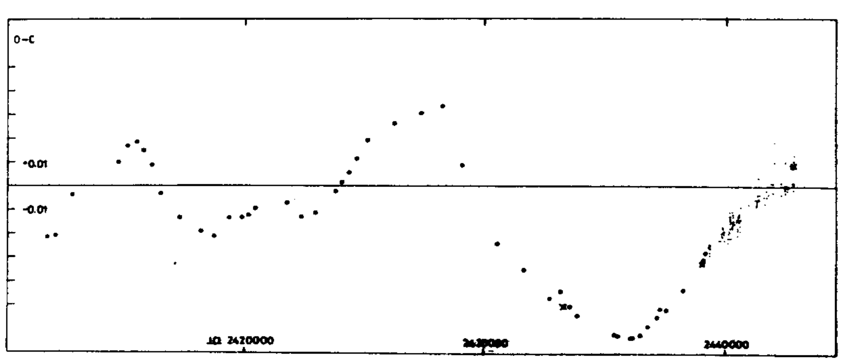
$$\begin{matrix}\text{Primary minimum} = 242\ 3977.1915 \\ \text{Secondary minimum} = 242\ 3977.8701\end{matrix} + 1\overset{d}{.}357278 \cdot E$$

Table 1

Secondary minima of XZ And

J.D. hel.	E	O-C	Observer
243 3231.7415	+ 6818	-0.0500	Blitzstein
243 9020.5507	+11083	-0.0315	Reinhardt
244 2742.2476	+13825	+0.0092	Kreiner

The O-C diagram of XZ And is given in Fig.1. The diagram is constructed on the basis of Todoran's paper (1967) and completed



with visual observations up to January 1976. The crosses on the O-C curve represent the secondary minima.

The position of secondary minima on the O-C diagram excludes the explanation of the observed changes in the period by apsidal motion.

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1123

Konkoly Observatory
Budapest
1976 April 6

THE ECLIPSING/SPECTROSCOPIC BINARY HD 193964 = 71 Dra

The star 71 Dra was found to be a photmetric variable by W. Fuertig (IBVS No. 1071). The star was already known as a spectoscopic binary for which this writer had published a solution (J.R.A.S.C. 67, 161, 1973) and in which it was remarked that there was an unusually large scatter in the radial velocities near the predicted time of conjunction. Fuertig and his collaborators have made additional photometric observations confirming that the star is eclipsing and has a period of approximately $5^{d}.2984$ (private communication). D.W. Willmarth, Toledo, Ohio, having apparently overlooked the earlier orbital solution, has independently observed the star spectroscopically and solved for the orbital parameters (P.A.S.P. 88, 86, 1976).

The two spectroscopic solutions differ substantially in the systemic velocity and semi-amplitude. Using all 52 published radial velocities which now extend over 56 years, the writer has obtained another solution which gives a period of $5^{d}.298095 \pm 0.000025$.

The system requires further spectroscopic observations since, clearly, the definitive spectroscopic orbital solution has not been published. It would also be of interest to clarify the nature of the radial velocity variations near conjunction.

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CONCERNING THE RELATIVE MAGNITUDES OF THE SS CYGNI COMPONENTS

Presented here is a small sample of standardized UBV observations of SS Cygni, made with the 24-inch photometric reflector of Lick Observatory when SS Cygni was at minimum. For this sample $\overline{V} = 11.66$; $(\overline{B-V})_{obs.} = +0.53 \pm 0.05$.

$JD_{\odot}$	V	B-V	U-B
2442550.962	11.62±0.03	0.52±0.02	-0.70±0.03
2551.935	11.70	0.50	-0.83
2577.973	11.63	0.41	-0.78
2578.977	11.60	0.53	-1.08
2579.973	11.76	0.71	-1.00

Joy (1956) states that the system consists of a dG5 star and a sdBe companion, and that the absolute magnitudes of the two stars are equal.

If one considers a model SS Cygni system consisting of a dG5 star with B-V = +0.70 and a white dwarf companion with B-V= -0.10, at a distance of 270 pc, with a(r) = 1 mag/kpc and R= $A_V/E(B-V) = 3$ (giving E (B-V)= 0.09 mag), then the combined light of the two stars can give an observed (reddened) B-V of +0.53 only if the white dwarf is 1.2 magnitudes fainter in V than the main sequence star. With an absolute visual magnitude of +5.1 for the primary, the combined $M_V = +4.8$ is consistent with the value derived with the formula $M_V = m_V + 5 - 5\log(r) + A_V$, with $m_V = 11.66$, r = 270 pc, and $A_V = 0.27$ mag. An uncertainty of ±0.05 mag in the observed B-V results in an uncertainty of ±0.8 mag for the visual magnitude difference between the stars.

We may conclude that the hot component of the SS Cygni system is probably fainter in V than its main sequence companion, by about one magnitude.

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Reference:

Joy, A.H. 1956, Ap. J. 124, 317

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Konkoly Observatory
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1976 April 12

A STUDY OF THE PERIOD OF HR 6684

The variability of HR 6684 (=HD 163472, $\alpha_{1900}=17^h51^m.3$, $\delta_{1900}=+0^\circ41'$, V=5.81, B2 IV-V) was discovered by Jerzykiewicz (1972, Publ.Astron.Soc.Pacific 84, 718) whose observations indicated a period of $0^d.13989$ and an amplitude of 0.04 in b. The short period, the small amplitude and the spectral type led Jerzykiewicz to suggest that HR 6684 is a β Cephei (or β Canis Majoris) type variable, although the derived period is quite short for this class of stars. Observations by McNamara and Bills (1973, Publ.Astron.Soc. Pacific 85, 632) seemed to confirm the variation of HR 6684 with Jerzykiewicz's period, but this period did not satisfy their observations of the radial velocity made to test the classification as a β Cephei variable. The earlier radial velocity observations by Feast, Thackery and Wesselink (1957, Mem.Roy.Astron.Soc. 68,11) and Petrie and Pearce (1961, Publ.Dominion Astrophys.Obs.12,1) also seemed to have the same problem. These facts combined with the rather short period suggest that the period found by Jerzykiewicz might be spurious, a common accurance with short period variables observed for less then a complete cycle. New photometric and radial velocity observations by Morton and Hansen (1974, Publ.Astron. Soc.Pacific 86, 943), Bolton, Percy, and Shemilt (1975, Publ.Astron. Soc.Pacific 87, 595) and Pike (1974, Publ.Astron.Soc.Pacific 86, 681) seemed to be satisfied by Jerzykiewicz's period but they did not rule out the possibility of an alternative period since in each case less than a full cycle of the variation was covered.

In order to test if the period found by Jerzykiewicz is spurious a new period determination for HR 6684 has been carried out using all available observations, both photometric and of radial velocities. The method of Lafler and Kinman (1964, Astrophys.J. Suppl.9, 216) was used to search each set of observations for possible periods in the range 0.11-0.21 days. It was found that there are <u>two</u> (but only two) periods in this range that satisfy all the observations:

$$P = 0^{d}.139889; \qquad 1/P = 7.1485\ d^{-1}$$
$$P = 0^{d}.162723; \qquad 1/P = 6.1454\ d^{-1}$$

The first period is that previously accepted and the other the period related with this by one in the reciprocal.

The available observational material was insufficient for determining which of the two possibilities is the true period. An attempt to decide the question by comparing the absolute magnitude implied from H_{γ}, H_{β}, and H_{α} photometry with the known period-luminosity law for β Cephei stars was also inconclusive but showed that whichever of the two is correct HR 6684 is most likely pulsating in the first vibrational mode.

Further photometric and radial velocity observations of HR 6684 covering at least 5^{h} are desired to clarify the question of its period.

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AMENDMENT

to the paper "Ultra-Violet Blazhko-Effect of X Ari" published in IBVS No.1097

I have noticed some errors I made in Umax-magnitudes of X Ari on the second page of my paper, however, all conclusions remain unchanged. The correct magnitudes should be:

JD 2438017 - 9.45 mag, 2437918 - 9.50, 2437976 - 9.49,

2437916 - 9.50, 2438010 - 9.46, 2437945 - 9.48 (in order of the text).

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EVIDENCE FOR A BUMP IN THE LIGHT CURVE OF VARIABLE 1 OF M13

That there is a relationship between the pulsation period of population I cepheid variables and the occurence of a secondary bump in the light curve has long been known (Hertzsprung 1926, B.A.N. 3, 115). Recent theoretical calculations predict that a similar relationship should exist for the population II cepheids with periods in the range 1-3 days and Stobie (1973, Observatory 93, 111) showed that bumps do occur in the light curves of seven halo and old disk cepheids with periods in this range, including two globular clusters members.

The importance of the detection and observation of the bumps is that a determination of the phase at which the bump occurs permits the mass and radius of the star to be calculated. Cepheids with bumps in globular clusters are particularly important since the derived masses and radii can be compared with similar values for cepheids or horizontal branch stars determined by independient methods.

Variable 1 of the globular cluster M13 has a period in the range where a bump is predicted and indeed there is some evidence for a bump in the m_{pv} light curve of this star published by Arp (1955, A.J. 60, 1). In an attempt to confirm if the suspected bump really does exist we have collected together all the published photometric observations of M13-Var.1 and plotted the light curves of the various authors using the same period. The data are not very satisfactory, most being eye estimates of the photographic magnitudes. Nevertheless, the observations of Sawyer (1942, Publ. David Dunlap Obs. 1, 231), Kollnig-Schattschneider (1942, A.N. 273, 145) and Osborn (1969, A.J. 74, 108) show evidence for a bump in the light curve near phase 0.8. The observations of Shapley (1915, Mt. Wilson Contrib. 6, 301), Demers (1971, A.J. 76, 445) and Russev (1973, Variable Stars 19, 181) either have too few observations or do not cover the appropiate part of the light curve and give no evidence one way or the other. However, the fact that all the apparent bumps occur at aproximately the same phase as the bump seen in Arp's more accurate light curve from iris photometry indicates that the feature is probably real.

Assuming that there is a bump in the light curve of M13-Var.1 at phase 0.8 we can use the equations given by Stobie to calculate the stellar radius and mass. The results are R= 5.8 R☉ and M= 0.2 M☉. The values are somewhat smaller that those found for the other population II cepheids studied by Stobie but they agree with the mass and radius of this star calculated by Böhm-Vitense et al (1974, Ap. J. 194, 125), who also commented on the apparently anomalously low values. It is interesting that Osborn's masses for two asymptotic branch stars in M13 were also very small. It is obvious that the determination of a good photoelectric light curve for this star would be worthwhile.

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INFORMATION BULLETIN ON VARIABLE STARS
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Konkoly Observatory
Budapest
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TIMES OF MINIMA OF RZ OPHIUCHI

The eclipsing binary RZ Oph shows spectroscopic evidence of mass transfer, and yet it is unlikely that either star in the system fills its Roche lobe (Baldwin, unpublished). Two recent primary eclipses were observed photoelectrically (with B and V filters) with the 12-inch telescope of the University of Victoria, Victoria, British Columbia. Although not enough observations were obtained to warrant an orbital solution, times of minima and times between contact points were determined.

$$T_{min}\ (JD) = 2,441,942.3 \pm 0^{d}_{.}2$$
$$2,442,204.1 \pm 0^{d}_{.}2$$

Duration of totality = $9^{d}_{.}3 \pm 0^{d}_{.}2$
Duration of each partial phase = $1^{d}_{.}5 \pm 0^{d}_{.}2$

The uncertainties were estimated visually from the light curve. The values for the duration of totality and the duration of each partial phase are significantly different from those listed in the current literature (e.g., Rocznik Astronomiczny Observatorium Krakowskiego, 1975).

A linear ephemeris was derived from these and an additional 32 times of minima uncovered during a literature search:

$$T_{min}\ (JD) = (2,442,204.4 \pm 0^{d}_{.}2) + (261^{d}_{.}928 \pm 0^{d}_{.}003)E ,$$

where E is the cycle number. There is no evidence for a period variation within the uncertainties of the observations.

The next primary eclipse occurs in late July 1976, and additional photometric observations at that time are desirable.

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RECENT PHOTOELECTRIC OBSERVATIONS OF UX URSAE MAJORIS

Eclipses of the nova-like variable UX Ursae Majoris have been observed since its discovery (Beliavski 1933), From visual observations Zverev and Kukarkin (1937) established that the system had the relatively short period of 4^h43^m. Since then a number of observers including Krzeminski and Walker (1963), Mandel (1965), Nather and Robinson (1974) and Africano and Wilson (1976) have pointed out that the observed time of minimum varies with respect to the computed time in a cyclic way with a period of about 29 years.

At least three mechanisms have been invoked to explain this phenomenon: mass transfer or the presence of an unseen third companion (Nather and Robinson 1974); apsidal motion (Africano and Wilson 1976). As the latter have pointed out, however, more observations are needed to determine how exactly the variation repeats. Such are given here.

Three times of minima were recently determined from photoelectric observations made in blue light with the #2, 90-centimeter telescope at Kitt Peak and are presented in Table I.

Table I

Observations

$JD_{\odot}$ Minimum 2440000+	O-C (day)
2804.8971	-0.0010
2806.8638	-0.0010
2807.8471	-0.0011

The residuals, second column, have been computed from Mandel's (1965) ephemeris for the times of eclipse. The phase corresponding to the observed times, again from a relation given by Mandel, is 0.73.

Because of cycle to cycle variations in the light curves at minimum, one would like to have at least six minima from which to determine a mean value for the residuals. Since this condition is not met by the present observations, likely lower weight should be given the location of the point determined by the present results in the O-C versus phase diagram (see, for example, Figure 1 of Africano and Wilson 1976). However, the point lies close to the predicted curve and is in keeping with the suggestion that the cyclic behaviour of the residuals has a geometric cause.

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References:

Africano, J., and Wilson, J. 1976, Pub. A. S. P. 88, 8
Beliavsky, S. 1933, N. N. V. S. 4, 196
Krzeminski, W., and Walker, M. F. 1963, Ap. J. 138, 146
Mandel, O.E. 1965, Perem. Zvezdy 15, 474
Nather, R.E., and Robinson, E.L. 1974, Ap.J. 190, 637
Zverev, M., and Kukarkin, B. 1937, N. N. V. S. 5, 125

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1129

Konkoly Observatory
Budapest
1976 May 3

OBSERVE ϑ^1 Ori A !*

Photometry in an instrumental UBVR-system of another minimum of ϑ^1 Ori A on 1975 December 05 was made at the Bochum 61-cm-telescope on La Silla (Chile) using the equivalent point method described by Hall and Garrison (1969). The observations confirm the preliminary period (Lohsen 1975) and, together with Strand's (1975) two estimates lead to an improved period of 196.297 ± 0.001 days. Since the minimum of 1974 April 25/26 depends only on one dubious estimate, only the double value, P_o= 392.594 d can be considered as the definite fundamental period. Because of the depth of the minima in 1975 (Walker 1976) and in 1973 and the symmetrical shape, the minimum on 1974 November 08 was certainly not a secondary, i.e. $P \neq 2P_o$. Visual estimates on 1976 March 12.75 preclude a period $P = P_o/4$ = 98.15 d, too.

Using P_o= 396.594 d the observed parts of minima of three consecutive years can be fitted together (Fig. 1) to estimate the total duration D = 20 + 2 h and the constant phase d = 2.5 ± 1 h. With the aid of the Russell-Merrill tables (1950) a ratio of the radii $k = r_s/r_g$ = 0.80 ± 0.05 (est.err.) and a central eclipse ($\cos i < (1-k)r_g$) was found. The low precision of the scanner observations in 1973 do not allow to decide whether primary minimum is a transit or an occulation. In both cases it seems to be difficult to explain the almost insignificant color dependence of the depth of minimum (Table 1). While the observations in 1973 might have been affected by systematic errors this explanation seems to be improbable for the photometry in 1975. A spectral type of BO for the larger component is consistent with Petrie's (1965) classification BO.5 as well as Morton and Adams' (1968) color indices and an interstellar reddening of E(U-B)/E(B-V)= 0.72. If primary minimum is a transit, the type of the smaller component should be later than A5, in the occultation case it should be earlier than O5. The occultation case requires relatively small radii $R_g = 3R_\odot$ and $R_s = 2.4\ R_\odot$ in order to explain the total absolute magnitude

*Based on observations made at the European Southern Observatory.

$M_V = -2\overset{m}{.}2$ ($m_V = 6\overset{m}{.}7$; $A_V = 0\overset{m}{.}9$; DM = $8\overset{m}{.}0$). A similar small radius of $R = 2.5R_\odot$ has been found (Hall 1971) for the brighter component of BM Ori = ϑ^1 Ori B, which is of spectral type B1-B3.

Taking the radius $R_g = 3.0R_\odot$ estimated from photometry in the occultation case, k = 0.8, and the total duration of primary minimum D = 20 h, we get a tangential relative velocity

$$v = 2R(1+k)/D = 105 \text{ km/s} = 22.15 \text{ au/y}.$$

With a circular orbit this yields a total mass

$$M_1 + M_2 = r^3/P^2 = P(v/2\pi)^3 = 47 M_\odot \text{ (assuming } P=P_0 = 1.075 \text{ y)}$$

Considering all the uncertainties, this seems to be consistent with the spectral types. The transit case, however, taking $R_g = 4R_\odot$ would yield a total mass of 112 $M_\odot$, i.e. an eccentric orbit must be assumed, which is quite common for widely separated pairs.

Feibelman (1975a) has found two secondary minima of $\Delta m = 0\overset{m}{.}8$ on old plates. The depth is inconsistent with the depth of primary minimum ($1\overset{m}{.}0$). Later (1975b) he corrected Δm to "considerable", which is more in accordance with the $0\overset{m}{.}3$ expected in the occultation case. A minimum of this depth should be detectable by visual estimates which were made at Hamburg Observatory throughout 1974, 1975 and 1976. They failed to show a secondary on 1975 February 23 and 1976 March 21, whereas around 1975 September there seem to have been a shallow dip. If these estimates and Feibelman's observations are real, the period is indeed 392.594 days and the orbit is considerably eccentric.

Taken altogether, the available observations are insufficient for a detailed planning of all further observations. As this system possibly allows us to measure accurately the mass and the radius of a young undisturbed B0 type star, every effort should be made to observe at least the next primary minimum on 1977 January 01.1 since a similar oppurtunity may not occur before six or even twelve years. Spectroscopic observations are needed especially within some weeks before primary minimum. Apart from a desirable continuous survey, photometry is important near the expected secondary minima, i.e. 1976 September 25 to October 10 and 1977 April 11 to 25.

Table 1

Magnitude differences θ^1 Ori A minus C

Date	ΔV	Δ(U-B)	Δ(B-V)	Δ(V-R)
1975 Dec. 03/04	1.634±3	0.079±5	0.006±4	-0.009±3
1975 Dec. 05				
3.2 to 4.8 h UT	1.690	0.074 6	0.014 3	-0.014 3
4.9 to 6.8 h UT	1.865	0.092 3	0.010 3	-0.010 4
6.9 to 9.0 h UT	2.160	0.090 6	0.026 4	-0.003 5
1975 Dec. 05/06	1.632±4	0.074±6	0.010±4	-0.011±3
1975 Dec. 06/07	1.631 5	0.081 9	0.006 5	-0.010 4
1975 Dec. 07/08	1.629 3	0.080 4	0.010 7	-0.015 5

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References:

W.A. Feibelman, 1975a, AAVSO meeting 1975 October
1975b, IAU Circ. No. 2859

D.S. Hall and L.M. Garrison, 1969, PASP 81, 771

D.S. Hall, 1971, Proc. IAU Coll. No. 15 = Kl.Veröff.Bamberg Vol.9, No. 100, p. 217

E. Lohsen, 1975, IBVS No. 988

J.E. Merrill, 1950, Princeton Obs. Contr. No. 23-26

D.C. Morton and Th.F. Adams, 1968, Astrophys.J.151, 613

R.M. Petrie, 1965, Pub. Dom. Obs. Victoria 12, 317

K.Aa. Strand, 1975, IBVS No.1025

M.F. Walker, 1976, IBVS No. 1080

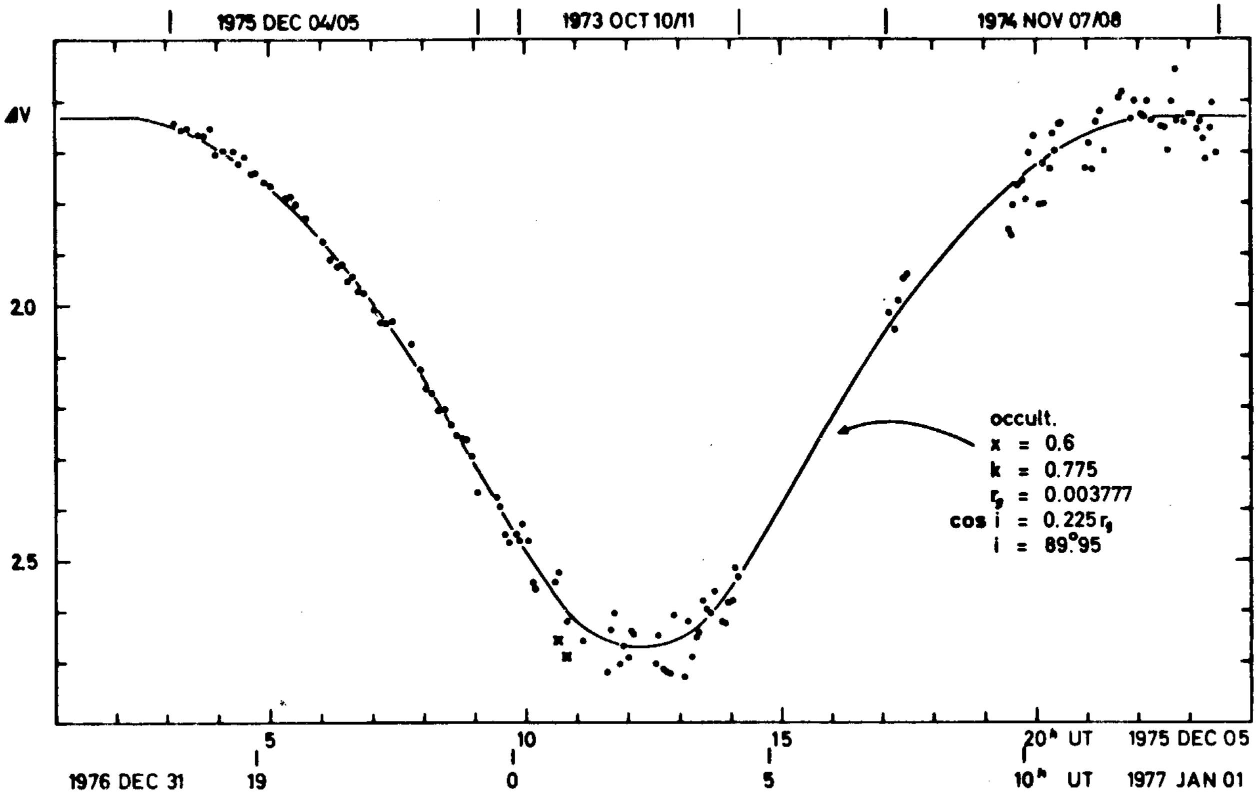

Fig.1: Magnitude differences ϑ^1 Ori A – C

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Rothney Astrophysical Observatory Publication Series B, No. 3

CAII H AND K EMISSION OF RT Lac

Microdensitometer scans of 8 spectra of RT Lac, a $5^{d}.07$ period eclipsing binary similar to the RS CVn type binaries, were carried out at the University of Calgary. The spectra, all at the identical dispersion of 78 A mm^{-1} were obtained at the Dominion Astrophysical Observatory in 1974 between JD 2442068 and 2442287.

The light curve of this binary undergoes periodic changes due to a sinusoidal distortion wave which regresses through the light curve with a period of about 10^{y}. The location of the peak of the distortion wave relative to the orbital period was obtained from an unpublished relation found by Hall and Milone. At the time of the observations the peak corresponded to the primary minimum of the binary.

Our data (Fig. 1) suggest the preliminary result that the variation of the CaII K emission intensity, as indicated by the ratio of the K2 component to the continuum, with phase, apparently reached a maximum at primary minimum. The emission at CaII H defined in the same way was apparently more uniform in phase (Fig. 1). These results contrast with the findings of Weiler (1975) that the phases of maximum emission coincide with the minimum of the wavelike distortion in the systems RS CVn and UX Ari. Studies are continuing and a more complete discussion will appear elsewhere.

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Reference:

Weiler, E.J. 1975, I.B.V.S. No. 1014

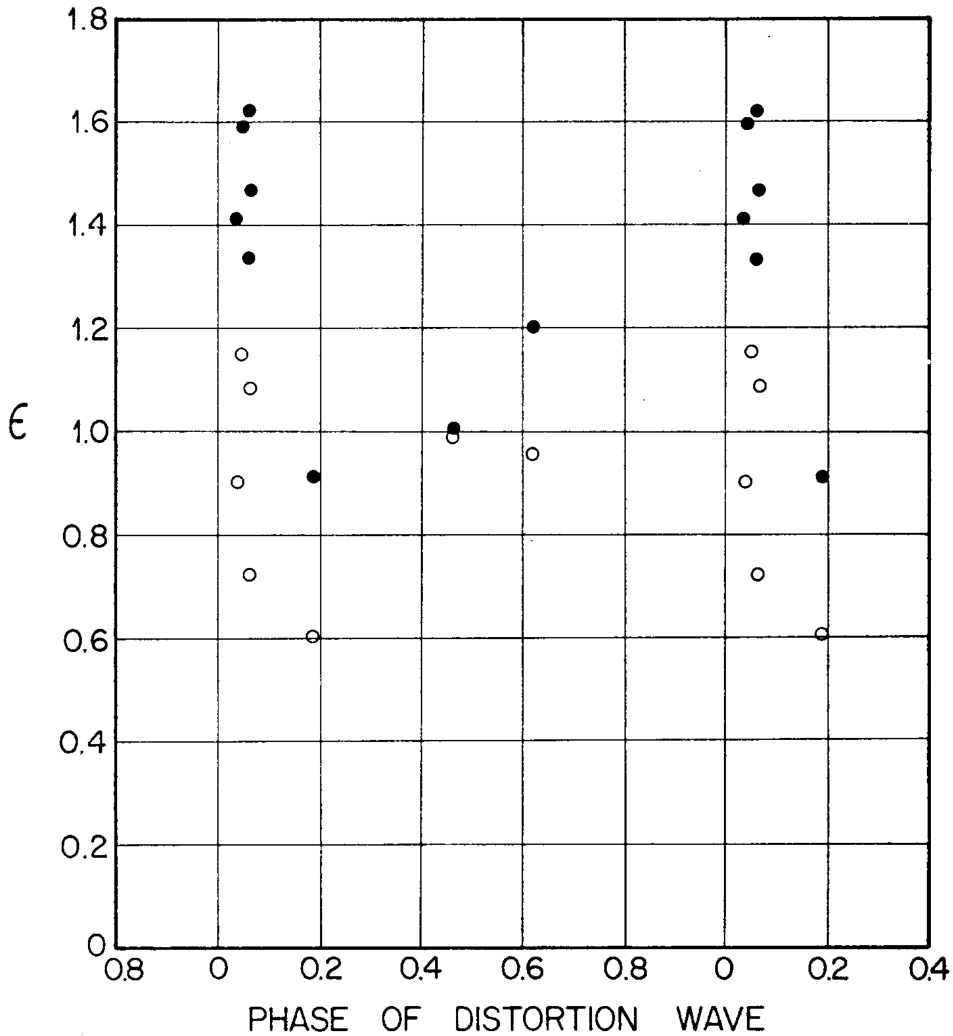

Fig. 1. A measure of the H (open circles) and K (filled circles) emission in RT Lacertae plotted against phase of the distortion wave. Phase 0.0 corresponds to the peak of the sinusoidal wave in 1974, and coincidentally with the primary minimum.

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Budapest
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ON CHANGES OF PERIOD OF PULSATING STARS

A loose correlation had been found by Vasiljanovskaya and Erleksova (1968) between period and abrupt change of period for Population II Cepheids. The changes of period we have found in recent years at the Maria Mitchell Observatory for Mira and RR Lyrae type stars seemed to fall nicely along the projections of this relation. I have therefore scanned the Remarks in the GCVS and its Supplements in order to ascertain how general this relation is.

In Figure 1 are plotted the values of log(ΔP/P) against log P, where ΔP is the maximum difference between the various periods published for any given star. Stars with ostensibly constantly changing periods ($JD_{max} = JD_o + nP_o + kn^2$) are included, the change of period adopted in the Figure corresponding to a twenty-year interval from the epoch of P_o. For such stars it is frequently unclear

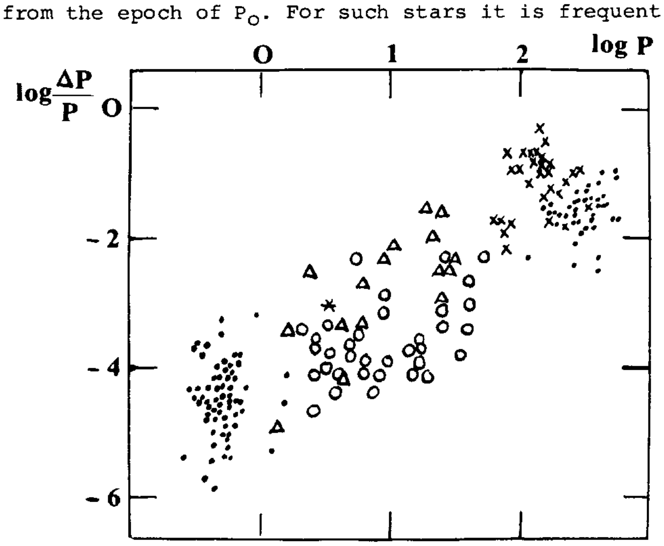

Figure 1. Observed relationship between periods and extreme changes of period. Symbols: dots at right, Mira type; crosses, SR; triangles, W Virginis; open circles, classical Cepheids; dots at left, RR Lyrae stars. The one asterisk is for CG And, classified as α C Vn type.

whether a progressive or sudden change of period is the more probable. Omitted are a few stars for which the original references indicated insufficient data to substantiate the indicated changes of period. Stars with recorded Blazko effect, and those whose periods appear to change cyclically as indicated by sine or cosine terms were disregarded.

The average values for each type of variable represented are shown in Figure 2. The W Virginis stars and the δ Cepheids are each divided into two groups, those longer and those shorter than ten days. The RR Lyrae stars are separated into three groups: those with sub-class ab (52 stars), sub-class c (7) and the ones for which no sub-type is given (11). For comparison, the open circle shows the average for the more thoroughly investigated galactic RR Lyrae type stars published by Tsesevich (1972) and those in M5 studied by Coutts and Hogg (1969).

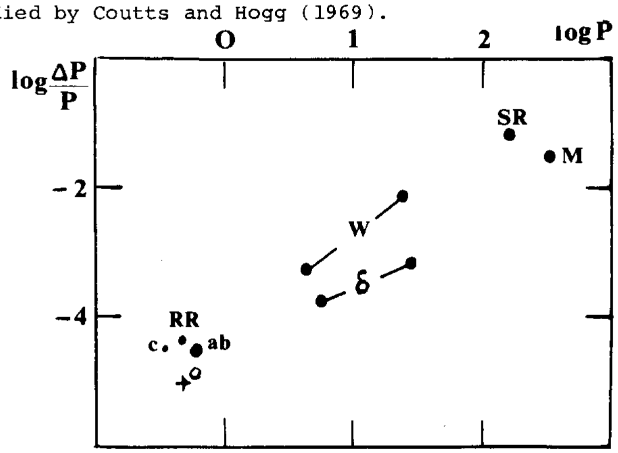

Figure 2. Mean points for the various types of stars in Figure 1. The open circle represents the galactic RR Lyrae stars investigated by Tsesevich; the cross, those in M5 analysed by Coutts and Hogg.

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Vasiljanovskaya, O.P., and Erleksova, G.E. 1968, Non-Periodic Phenomena in Var. Stars, L.Detre, ed., Budapest, 321-324

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INFORMATION BULLETIN ON VARIABLE STARS
Numb 1132

Konkoly Observatory
Budapest
1976 May 20

LIGHT ELEMENTS OF HD 123732

The eclipsing character of HD 123732 was discovered by Bond (1970) on Curtiss-Schmidt prism-objective plates and confirmed by y-photoelectric observations.

We report in this Note the times of minimum and light elements obtained from 231 UBV observations secured at Bosque Alegre Station of Córdoba Observatory. They were made with the 60 inch telescope of the Observatory through a UBV set of standard filters and an RCA 1P21 multiplier refrigerated in a box containing dry ice. The observations show the system to be a W UMa star with shallow and almost equal minima.

We derived six times of minimum for each light curve in U, B, and V. They are listed in Table I; the residuals (O-C) and cycles are from the linear least squares ephemeris:

$$\text{P.M.} = \text{JD hel. } 2442196.09732 \underset{\pm 47}{} + 0\overset{d}{.}39395129 \underset{\pm 35}{} \cdot E$$

including two times of minimum computed from the y-observations kindly supplied by Dr. Bond.

Table I: Times of minimum of HD 123732

Min.	Color	JD hel. 2440000 +	W	Cycles	O-C
I	V	649.8352	2	-3925.0	-0.0032
II	V	650.0381	3	-3924.5	+0.0027
I	V	2122.8225	3	-186.0	+0.0001
	B	.8194	3	-186.0	-0.0030
	U	.8211	3	-186.0	-0.0013
II	V	2195.5057	1	-1.5	-0.0007
	B	.5039	1	-1.5	-0.0025
	U	.4996	1	-1.5	-0.0068
I	V	2195.7032	3	-1.0	-0.0001
	B	.7032	3	-1.0	-0.0001
	U	.7035	3	-1.0	+0.0002
I	V	2196.4931	1	+1.0	+0.0018
	B	.4887	1	+1.0	-0.0026
	U	.4908	1	+1.0	-0.0005
II	V	2196.6855	2	+1.5	-0.0027
	B	.6861	2	+1.5	-0.0021
	U	.6879	2	+1.5	-0.0003
II	V	2221.5121	2	+64.5	+0.0049
	B	.5124	2	+64.5	+0.0052
	U	.5139	2	+64.5	+0.0067

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Reference:
Bond, H.E. 1970, Pub.A.S.P., 82, 1065

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Konkoly Observatory
Budapest
1976 May 21

A REVISED EPHEMERIS FOR AN URSAE MAJORIS

Following publication of my previous note (Mumford, 1976) on this object, Prof. Kukarkin very kindly provided a copy of Shugarov's (1975) original contribution. The light elements that best fit the previously given epoch, the photoelectric observations made at Kitt Peak, and currently accepted models of novalike variables requires that the period be one-half of that given previously.

Min. J.D. hel. = 2442502.285 + $0^d.0796894 \cdot E$.

With these elements, the following residuals are calculated.

JD hel. 2442000 +	Cycle	O-C
502.285	Epoch	
805.9813	3 811	$0^d.0000$
806.9378	3 823	+0.0002
807.7345	3 833	0.0000
807.8938	3 835	0.0000

This result is in keeping with a suggestion made by Shugarov.

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Mumford, G.S. 1976, Inf.Bull.on Var. Stars, No. 1109
Shugarov, S.Y. 1975, AC, No. 887

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VARIATIONS D'ECLAT RAPIDES DE BL LACERTAE

Astre BL Lacertae a été observé avec le télescope de Maksoutov (35/49/120 cm) de l'Observatoire astronomique d'Engelhardt pendant quelques heures le 1 Octobre et le 4 Novembre 1975. Les observations photographiques ont été effectuées dans les conditions suivantes: 16 clichés sur les plaques Kodak 103a-O (le 1 Octobre)et 26 clichés sur les plaques Kodak IIa-O (le 4 Novembre), sans filtre.

La durée de poses a été égale 14-15 minutes.

Tous les clichés ont été mesurés à l'Observatoire d'Engelhardt avec un photomètre à iris, en utilisant les étoiles de comparaison de Bertaud et al (Astron. and Astrophys.3,4,436,1969). Le tableau indique les magnitudes de BL Lacertae:

NN	1975	UT	BL	c	NN	1975	UT	BL	c
1649	1 Oct.	18^h44^m	$15^m.02$	$15^m.18$	1684	4 Nov.	$17^h.34^m$	$15^m.02$	$15^m.16$
1650	"	19 06	15.69	15.10	1685	"	17 48	15.25	15.11
1651	"	19 25	15.72	14.96	1686	"	18 03	15.33	15.20
1652	"	19 43	15.32	15.00	1687	"	18 22	14.96	15.20
1653	"	20 01	15.38	15.20	1688	"	18 33	14.92	15.08
1654	"	20 18	15.51	15.11	1689	"	18 48	14.63	15.28
1655	"	20 34	15.92	15.26	1690	"	19 03	15.13:	14.80
1656	"	20 53	15.80:	15.10	1691	"	19 18	14.88:	15.16
1657	"	21 10	15.90	14.84	1692	"	19 36	15.18	15.04
1658	"	21 28	15 34	15.10	1693	"	19 52	15.06	15.20
1659	"	21 44	15.65	15.26	1694	"	20 08	14.98	15.16
1660	"	22 02	15.61	15.23	1695	"	20 23	15.04	14.80
1661	"	22 22	15.57	15.25	1696	"	20 38	15.25	14.95
1662	"	22 39	15.70	15.28	1697	"	20 53	14.98	15.26
1676	4 Nov.	15 33	15.28	15.23	1698	"	21 08	14.73	15.18
1679	"	16 19	15.40	15.20	1699	"	21 23	14.88	15.20
1680	"	16 34	15.18	15.20	1700	"	21 38	15.40	14.95
1681	"	16 48	15.01	14.90	1701	"	21 54	14.95	15.08
1682	"	17 03	14.89	15.18	1702	"	22 09	14.97	15.11
1683	"	17 21	15.05	15.16	1703	"	22 24	15.10	15.15

La Fig. 1 montre les variations d'éclat de BL Lac du 1 Octobre 1975. Sur la Fig.2 on peut regarder celles du 4 Novembre 1975.

L'étoile de comparaison c a été mesurée avec BL Lacertae et les magnitudes de cette étoile a été données dans le tableau et dans les Figures 1 et 2.

Comme on peut voir dans les figures, BL Lacertae a les variations d'éclat très rapides avec le temps caractéristique plus moins qu'une demiheure. Et nos observation confirment les conclusions de Bartaud et al (Astron. and Astrophys., 3,4,436,1969), de Milone E.F. (Publ.Astron.Soc.Pacif., 84,50,723,1972) et de Weistrop D. (Nature Phys.Sci., 241, 113, 157, 1973).

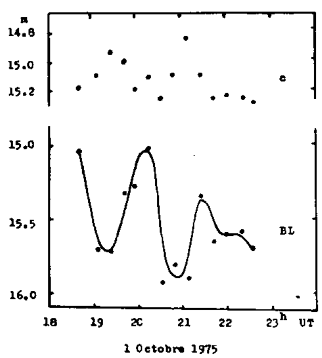

Fig.1.

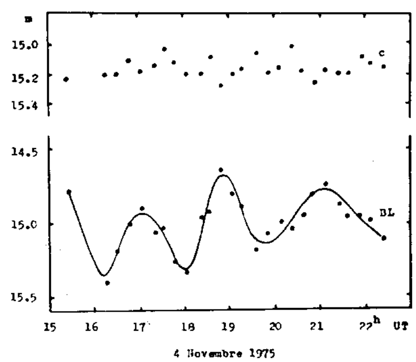

Fig.2.

Observatoire
astronomique d'Engelhardt

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INFORMATION BULLETIN ON VARIABLE STARS
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VARIABILITE D'ETOILES NAINES ROUGES

En vue de la réedition du "Catalogue of Nearby Stars", le Dr W.Gliese (Astron.Rechen Institut, Heidelberg) m'a demandé d'établir la liste de toutes les étoiles de son catalogue qui sont reconnues variables, ou soupçonnées de variabilité.

Le tableau suivant présente 47 naines rouges dont la variabilité a été soupçonnée; la première colonne donne la numérotation du catalogue de Gliese (1969), d'où sont extraits aussi la position et une partie des renseignements concernant V, B-V et le type spectral. Un certain nombre de ces étoiles proviennent de quatre listes publiées par l'auteur (Petit 1953,1968,1970,1975) et numérotées de 1 à 4.; j'ai cependant réexaminé tous les cas. Δ est l'importance des discordances observées.

La variabilité d'un certain nombre de ces étoiles est pratiquement certaine, notamment celle de Gl 73, 146, 169; 352, 730, 754.1 et 913.

Nous signalons aussi trois naines rouges qui ne figurent pas dans le catalogue de Gliese, mais dont la variabilité est certaine pour la première (G102-32=V1003 Ori) et probable pour les deux autres (G 177-4 et G 141-29). Elles ont éte signalées par Giclas et al. (1963, 1965) et appartiennent probablement toutes trois au type UV Ceti.

MICHEL PETIT

Gl	Designation	AR	Dec.	V	B-V	Sp	Pt	
43	L 220-80	$0^h53^m10^s$	-52°06'.5	12.5		m	1	2.0pg
57	-42°469	1 19 16	-41 54 7	10.2		dM1.5	1	1.1pg
63	Ross 10	1 35 07	+56 58 9	11.9		dM4	2	1.1pg
73	Wolf 1530	1 42 19	+16 06 2	14.4		dM4	1,2	1 pg
83.3	+61°366	1 58 23	+61 39 [illegible]	7.41	1.25	dK5		0.5pg
84.2	AC44°87262A	2 03 48	+44 57 2	11.1		dM0		1 v
85	L 89-27	2 05 56	-66 48 7	12.0		m	1	1.0pg
122	AC75°1146	3 03 15	+75 51 8	9.76	1.32	dM0	3	0.3 V
145	-45°1184	3 31 17	-44 52 3	11.1		dM4.5	2	0.9pg
146	-48°1011	3 33 26	-48 35 3	8.57	1.32	K7V	3	0.7pv
148	+3°515	3 38 34	+ 3 27 3	9.72	1.43	dM0p	4	0.2 V
165	Ross 29 AB	4 09 27	+50 24 2	13.7		dM5	4	1.5pg
169	+21°652	4 26 02	+21 48 7	8.27	1.35	dM1	2	0.9pv
199	-21°1131 AB	5 16 40	-21 26 7	9.4		dM0		0.8 v
207	Ross 409	5 29 53	+29 21 4	10.0		dK7	3	3 pg
258	AC+68°2911	6 59 07	+68 21 7	11.9		dM5	1	1.0pg
263	Ross 54	7 01 56	-10 25 3	11.4	1.62	dM5	1	0.2 V
281	+2°1729	7 36 48	+ 2 18 2	9.66	1.38	dM0	4	0.2 V
296	-39°3869	7 58 15	-39 53 5	9.62	1.33	K7V	1	0.7pg
341	-59°2351	9 20 24	-60 04 2	9.9		dM1	1	1.5pg
352	-12°2918 AB	9 28 53	-13 16 1	10.06	1.53	dM4	2	2.0 v
367	-45°5378	9 42 37	-45 32 8	10.61	1.55	dM4	1	0.9pg
477	-45°7872	12 33 15	-45 39 2	11.5		dM1	1,2	1.1pg
479	-51°6859	12 35 11	-51 43 6	10.65	1.47	dM3	4	0.14 V
499	+21°2486 AB	13 03 49	+20 59 7	9.43	1.45	dM0	4	1.7 v
508	+48°2108 AB	13 17 36	+48 02 4	8.54	1.48	dM2	2	1.5 v
508.3	Wolf 482	13 21 07	-13 46 8	11.6		dK7	1	1.5pg
536	-1°2892	13 58 31	- 2 25 3	9.8		dM0	4	0.5pg
546	+30°2512	14 19 48	+29 51 7	8.54	1.26	K8V	4	0.5pg
553	-7°3856 AB	14 28 12	- 8 25 3	9.40	1.41	K7V	4	0.6pg
579	+25°2874	15 05 16	+25 07 2	9.94	1.36	K7V	4	0.2 V
649	+25°3173	16 56 07	+25 49 6	9.72	1.50	dM2	4	0.1 V
668	-10°4471AB	17 16 25	-11 04 3	10.4		dM0		2.0 v
682	-44°11909	17 33 28	-44 16 6	11.21	1.52	dM5	4	0.5pg
686	L 1278-24	17 35 39	+18 36 4	9.62	1.53	dM1	4	0.2 V
693	L 205-128	17 42 24	-57 16 9	11.3	1.65	dM5	1	1.7pg
701	-3°4233	18 02 28	- 3 01 9	9.38	1.52	dM2	4	0.5pg
720	+45°2743 A	18 33 50	+45 41 8	9.82	1.42	dM2	1,2	0.9pv
723	Wolf 1466	18 37 32	-10 30 3	11.4		dM0.5	1	1.5pg
730	Ross 142	18 47 31	+ 3 02 1	10.72	1.49	dM2	4	0.15V
734	+10°3724 AB	18 52 33	+10 54 6	9.52	1.37	dM0		2.0 v
754.1	LDS 678B	19 17 51	- 7 45 3	12.75	1.31	dM5	3	0.6 V
806	Fur 53	20 43 18	+44 18 7	10.82	1.49	dM3	2	1.1pg
811.1	Wolf 896	20 54 04	-10 37 6	11.4		dM3.5	1	1.4pg
838.6	L 355-62	21 51 35	-47 14	12.1		dM2	2	2.1pg
876	-15°6290	22 50 35	-14 31 2	10.17	1.60	dM5	4	0.1 V
913	+45°4378	23 56 07	+46 27 0	9.62	1.44	dM0	3	0.5pv
	G 102-32	5 47 16	+ 6 46 0	13.5		m	3	1.5pg
	G 177-4	12 53 42	+51 12 1	14.3		m		1 pg
	G 141-29	18 40 27	+13 51 0	13.1		m		1 pg

Remarques:

43 CSV 102334
57 CSV 102349
73 CSV 102357; présente sur un cliché de mpg 15.3; sur 5 autres, de mpg 16.2
83.3 CSV 102367: signalée par Bouigue et al. (1961, 1962)
84.2 Bz 22; la variation de A à été signalée par Worley (Baize, comm. privée)
85 CSV 102373
146 binaire spectroscopique; spectre avec CaII en emission (Sahade 1953); pourrait être du type BY Dra
169 notée de mpv 8.4 à 9.2; spectre avec CaII en emission (Joy et Mitchell 1948)
199 Bz 50. Ecart 5"; A est binaire spectroscopique (Joy et Mitchell 1948); la variabilité possible du couple est signalée par Baize (1966 et comm. privée)
258 CSV 102535
263 CSV 102541
296 CSV 102577
341 CSV 102618
352 Bz 90. Couple très serre (0"5) très rapide: P=4.74 ou 9.48 ans (Tifft 1955); les composantes ont été mesurées égales (Kuiper, van Biesbroeck) mais ont été vues avec un Δm de 2 mag. par Worley; le spectre présente l'emission de CaII
367 CSV 102626
479 variabilité notée par Gliese (1969)
499 Bz 133 Couple en mouvement orbital (1"); le compagnon semble varier de 13.1 à 14.8 (Baize 1966)
508 Bz 136 Couple orbital; B varie, selon Baize de 1.5 m
649 binaire spectroscopique probable
668 Bz 169. Ecart 9";variabilité soupçonnée par Baize (1966 et comm. privée)
693 CSV 102836
720 couple très écarté (112"); c'est A (CSV 102880) qui semble varier de 9.0 à 9.9
723 CSV 102884
730 variation bien nette en V et B-V
734 Bz 182 (5"2); soupçonnée par Worley (Baize 1966)
754.1 Ecart. 27"5; B varie de mpv 12.2 à 12.8; confirmée par les observations photoélectriques: V=12.75, B=14.46 (Johnson) V=12.12, B=13.75 (Eggen); A est une naine blanche
811.1 CSV 103030
913 varie de mpv 9.3 à 9.8; spectre avec CaII en émission

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THIRTY ECLIPSING BINARIES PROBABLY 100 PS DISTANT FROM THE SUN

The list below contains thirty eclipsing variables, which may be 100 ps distant from the Sun. For these stars $\pi_f \approx 0\overset{''}{.}01$, where π_f denotes calculated photometric parallax (Dworak 1975).

DV Aqr	SV Cam	BS Dra	SU Ind	ER Ori	GR Tau
EE Aqr	VZ CVn	CO Eri	UV Leo	KZ Pav	HO Tel
RR Ari	CW Cas	GX Gem	AP Leo	RS Sct	DZ Vel
TZ Boo	RS Cha	RV Gru	UX Men	AU Ser	DL Vir
VW Boo	V1061 Cyg	HS Hya	V508 Oph	EN Tau	W Vol

The trigoneometric parallaxes for these thirty eclipsing binaries, together with forty given earlier (Dworak 1973), should be measured in the first term.

Moreover, the photometric and spectrophotometric observations of these eclipsing stars are very needed. These observations would considerably amplify the material for investigation of the physical properties of close binary systems.

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References:

Dworak, T.Z. 1973, I.B.V.S., No. 816
1975, Acta Astr., 25, 383

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THE POSSIBILITY OF THE SEARCH FOR RELATIVISTIC OBJECTS USING THE ELLIPSOIDAL VARIABILITY OF THE RUN-AWAY STARS

Some evidence for the binary nature of the run-away stars and their connection with relativistic objects appeared recently (Shklovsky, Astron.J.Letters,USSR,2,No2, 119,1976). In this connection we propose to search for the periodic optical variability of these stars in the filter B of the UBV system. The list of the run-away stars (Blaauw, BAN 15, 265, 1961) is: HD 210839,24912, 157857, 152408, 203064, 30614, 34078, 149757, 38666, 151397,149363, 19374, 97991, 197419, 41534, 214930, 216534, 4142, 201910. The periodic variability of the run-away stars may be connected with their tidal distortion caused by relativistic objects - neutron stars or the black holes. The amplitude of this periodic ellipsoidal light variations may be $\leq$ 0.05 and is independent on wavelength; the period is about some days. It is also interesting to investigate the physical light variations of the run-away stars and to compare them with the variations of "ordinary" O-B stars with small spatial velocity. Note that some run-away stars (for example μ Col - see Cousins et al., R.O.Bull.No25,1961) show small-amplitude variability which may be caused by the ellipticity of the optical star. The photometric investigations of run-away stars are very important and we suggest joint observational efforts in this field during 1976.

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TWO ERRONEOUS SUSPECTED VARIABLES

Entries Nos. 1676 and 2138 appear in the 1951 Catalogue of Stars Suspected of Variability in view of their inclusion in a 1906 abstarct by Henrietta Leavitt. However, as reference to the literature clearly shows, the objects actually referred to by that distinguished student of variable stars were CPD -59°3809 (=SV Centauri) and CoD -49°6972 (=SW Centauri) rather than, as stated, CPD -50°3809 and CPD -49°6972. Presumably these latter two stars are now, in fact, "beyond suspicion".

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Budapest
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CD $-30^{o}5135$

The emission-line star CD $-30^{o}5135$ (α: $7^{h}47^{m}.1$, δ: $-31^{o}1'$,1950) has recently been considered by Humphreys (PASP 87,933,1975) to be a double-line spectroscopic binary (F2ep Iab + B8:). The mean velocity of the metal lines was in mid-January 1974 about +70 km/s, whereas the hydrogen lines H8 to H10 had a mean velocity of -60 km/s. Hβ to Hδ were contaminated by emission. The higher Balmer lines were attributed by Humphreys to a late B-type component, whose presence was inferred from an enhanced ultraviolet continuum and the absence or weakening of several F-type metal lines in that wavelength region, as well as from the profiles of the higher Balmer lines (Humphreys, op.cit., and private communication).

Velocity determinations from two IIa-O coudé spectrograms(20 Å/mm) obtained with the ESO 1.5 m telescope in December 1973 do not support this interpretation. On 2 December 1973, the mean velocity of 21 metal lines was +127±2 km/s, which is comparable to the velocity, +141 km/s, measured by Merrill (PASP,54,155,1942). This spectrogram is not sufficiently exposed in the ultraviolet to permit accurate velocity determinations for the higher Balmer lines. However, from the positions of H8 and H9 entirely longwards of the Fe comparison lines at 3888.5 Å and 3834.2 Å, respectively, it can be clearly stated that these lines do not show the large negative velocity necessary in the presumed B8 binary component. In order to obtain the velocity of the higher Balmer lines with respect to the metal lines another spectrogram has been used. This spectrogram, taken on 8 Dec. 1973, has slightly doubled comparison lines. Many stellar lines are,however, narrower than the comparison lines, which shows that the shift in plate position took place before or after the exposure of the stellar spectrum. Thus, internal velocity determinations are presumed reliable. The metal lines have an internal mean error of the order of ±3 km/s, with an absolute value of the mean velocity in the range +125 - +175 km/s. Relative to the metal lines the hydrogen lines Hδ to H10 have a mean velocity of about -85 km/s. Taking the metal line velocity in early December 1973 as +130 km/s, we get the following results (with Humphreys's for comparison):

	Early Dec. 1973	Mid-Jan. 1974
Metal lines	+130 km/s	+70 km/s
Higher Balmer lines	+45 km/s	-60 km/s
[H and K CaII	+35 km/s	+15 km/s]

As the velocities of the two main line systems are both changed in the same direction, these data clearly speak against CD -30°5135 as a binary. A further indication is the fact that the F-type lines missing from Humphreys's spectra are present in mine, although the ultraviolet continuum appears to be somewhat enhanced also in these. The seeming lack of HeI or SiII lines attributable to the B8 component supports the same conclusion.

What might then be the cause of these velocity variations ? It is known that A-F supergiants in general show velocity variations, sometimes with appreciable differences in the behaviour of metal and hydrogen lines (e.g., Abt, Ap.J.126,138,1957). The amplitude of the variations in CD -30°5135 is, however, much larger than any found by Abt. A further fact is the observation by Humphreys (op.cit.) that the star became bluer by 0.1 magnitude from 2 Jan. to 3 Jan. 1974, while retaining its visual brightness. In addition, the P Cyg structure observed by Humphreys at Hγ and Hδ is absent from my spectra (Hγ may be partly filled-in by emission to the longward side, as its velocity is about 20 km/s less than that of the other hydrogen lines). Hβ appears rather strongly in emission on the December 1973 spectrograms, with a superposed absorption component shifted towards shorter wavelengths. Its velocity has not been measured, as this part of the spectrum is affected by astigmatism of the camera.

The accessible observations are too scanty to make possible an interpretation of the observed phenomena. CD -30°5135 obviously merits continued study. Further photometric data from January 1974 onwards would be of grat value for a decision whether the spectral changes have been accompanied by brightness and/or colour variations.

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OBSERVATIONS OF THREE U GEMINORUM STARS

The U Geminorum stars PU, PV and V 372 Persei have been discovered at Sonneberg Observatory in a field around R.A. 2^h40^m; D = +37°. Only few informations on these stars have been published by C. Hoffmeister (1967) and it is interesting to collect other observations for a better knowledge of their light curve.

To this purpose we have examined 67 blue (103a-O + GG 13) and 40 yellow plates (103a-D + GG 14) taken with the 67/90/210 Schmidt telescope of the Asiago Astrophysical Observatory between JD 2439145 and JD 2441975.

The B and V magnitudes of the comparison stars have been determined with the U,B,V sequence established by F. Bertola (1963, 1965) near the galaxy NGC 1058.

The variables

PU Per - This star shows two maxima in blue light. The first, at JD 2440644, is faint (17.4) and narrow with rapid evolution; the second is brighter (15.2) and larger (duration 6 days) . Table I lists the observations near the maxima.

Table I

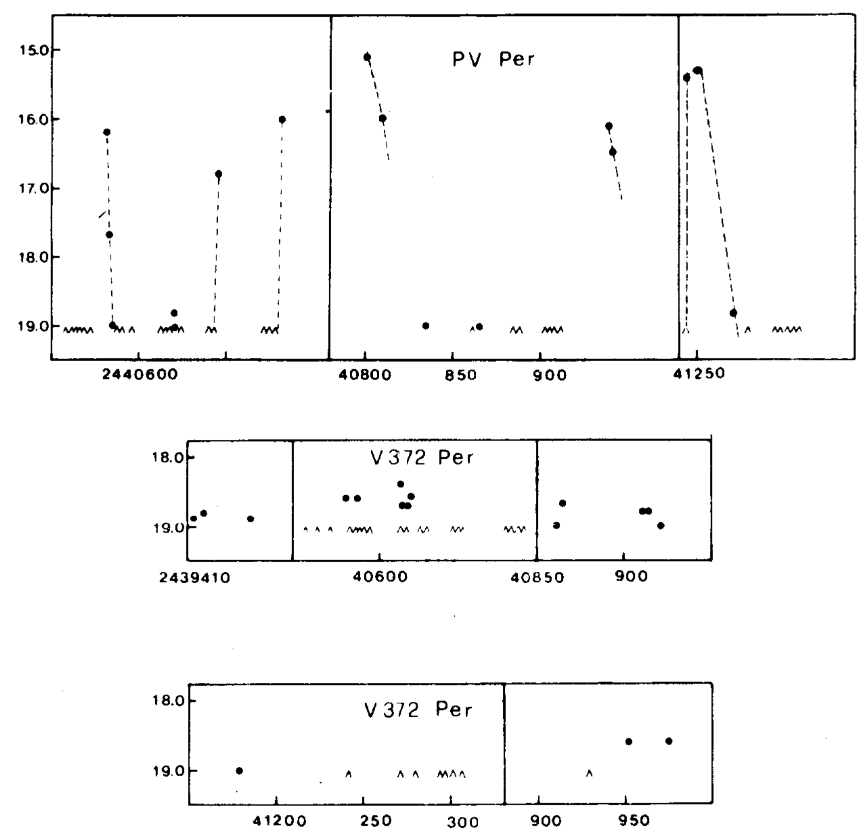
I Max JD 24...		II Max JD 24...	
40641	<19.0	41280	<19.0
644	17.4	295	15.2
645	<19.0	298	15.2
		301	16.6
		303	19.0
		308	<19.0

At minimum the variable presents light fluctuations near 19.0 B. The variations occur from 15.2 to <19.0.

PV Per - Table II gives the list of B and V maxima observed in our material.

Table II

Max. 24...	B	V	Max. 24...	B	V
39145	15.6	-	40802	15.1	15.3
732	16.7	-	940	16.1	16.0
40582	16.3	16.4	41250	15.3	-
646	16.3	-	542	15.3	-
682	16.0	-			



PV Per
15.0
16.0
17.0
18.0
19.0
2440600
40800
850
900
41250
V 372 Per
18.0
19.0
2439410
40600
40850
900
V 372 Per
18.0
19.0
41200
250
300
900
950

A mean cycle of 36 days satisfies the observations. The light curve of Fig.1 shows the occurrence of maxima faint and narrow, together with maxima bright and wide.

The B-V colour is about -0.1 at maximum. At minimum V light the star is below the plate limit.

The star varies between 15.1 and <19.0 in B and between 15.3 and <18.2 in V. On blue print of Palomar Sky Survey this star's apparent magnitude at minimum has been estimated about 20^m. It is possible that the variations in B are between $15^m.1$ - 20^m.

V 372 Per - In the present material this star is always near minimum. Fig.2 shows that the variable presents fluctuations between 18.4 and <19.0 B.

The colour B-V has been determined in the following occasions:

JD 24...	B	V	B - V
40866	18.7	18.1	+ 0.6
40915	18.8	18.0	+ 0.8

These values agree with the mean colour index of the U Geminorum stars near the minimum light. The presence of some galaxies around these variables suggests that the field is almost free of interstellar absorption.

The B magnitude 16.5 derived by C. Hoffmeister on the Palomar blue print is probably that of an intermediate phase between the maximum and minimum.

Concluding remarks:

During the period of our observations the three U Geminorum stars PU, PV and V 372 Persei show the characteristics listed in Table III.

Table III

Var.	B max.	V max.	B min.	V min.	B-V max.	B-V min.	cycle
PU Per	15.2	-	< 19.0	-	-	-	-
PV Per	15.1	15.3	< 19.0	18.2	-0.1	-	36^d
V372Per	-	-	< 19.0	-	-	+0.6;+0.8	-

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References:
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PHOTOELECTRIC MAXIMA OF VZ CANCRI

Between December 1973 and April 1976, 1800 photoelectric observations of the short-period variable VZ Cancri were carried out at the Astronomical Observatory of the University of Cluj-Napoca.

The observations were made in V light with a 50 cm Newton reflector, a photometer employing an unrefrigerated 1P21 photomultiplier tube and a Corning 3384 filter.

The comparison star was HD 73938 (BD+11°1894).

From the observed light-curves, by Pogson's method, 17 heliocentric maxima and the corresponding magnitudes $V_{max.}$ were determined. Table 1 contains the observed times of maxima, where the differences O-C's and the phase ψ_b (for the beat period) refer to the following elements

$$\text{Max.hel.} = \text{JD } 2433631.8655 + 0^d.17836367 \cdot E$$

for the principal period, and

$$\text{Max.hel.} = \text{JD } 2433631.8605 + 0^d.716292 \cdot E_b$$

for the beat period, respectively.

In order to have a general picture of period variation we have constructed the diagram $O-C=f(\psi_b)$ for heliocentric maxima. With this end in view we have used the corresponding observations made by Fitch (Ap.J.121,690,1955), Spinrad (Ap.J.131,134,1960), Oosterhoff (BAN 18,459,1966), and the determined maxima published by Guman (Mitt.d.Sternw.Budapest-Szabadsághegy, no.36,1955), and Popovici (IBVS 508, 1971). The results are presented in Figure 1. The diagram $V_{max}= f(\psi_b)$ is plotted in Figure 2, but here we have used only Fitch's, Spinrad's, Oosterhoff's and Todoran's observations.

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Table 1

Observed Maxima

Max.hel. 2442000+	$V_{max.}$	E	O−C	E_b	ψ_b
128.3910	$7^m.37$	476[illegible]	$-0^d.0063$	11861	$0^p.8252$
132.3295	7.37	47658	+ .0082	11867	.3236
161.3885	7.43	47821	− .0061	11907	.8924
453.5485	7.35	49459	− .0058	12315	.7706
474.4160	7.44	49576	− .0068	12344	.9034
476.3790	7.20	49587	− .0058	12347	.6439
485.4855	7.38	49638	+ .0041	12360	.3573
487.4465	7.50	49649	+ .0031	12363	.0949
508.3195	7.49	49766	+ .0076	12392	.2352
531.3285	7.33	49895	+ .0077	12424	.3577
756.4113	7.17	51157	− .0045	12738	.5910
771.3955	7.24	51241	− .0028	12759	.5101
785.4980	7.41	51320	+ .0090	12779	.1982
837.3865	−	51611	− .0064	12851	.6387
867.3600	7.22	51779	+ .0020	12893	.4840
871.2775	7.38	51801	− .0045	12898	.9532
873.4160	7.36	51813	− .0063	12901	0.9387

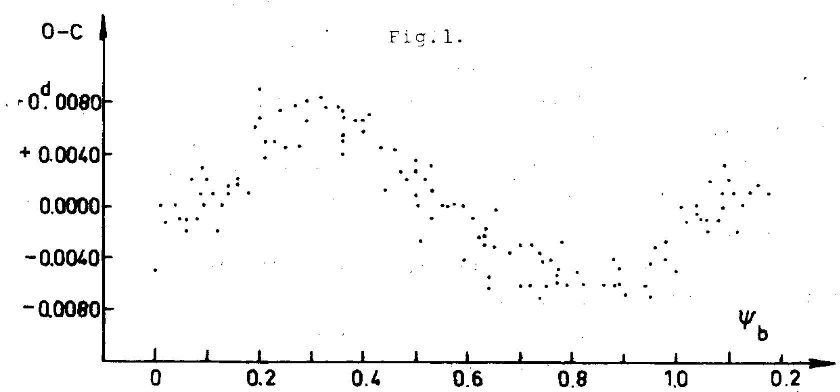

Fig.1.

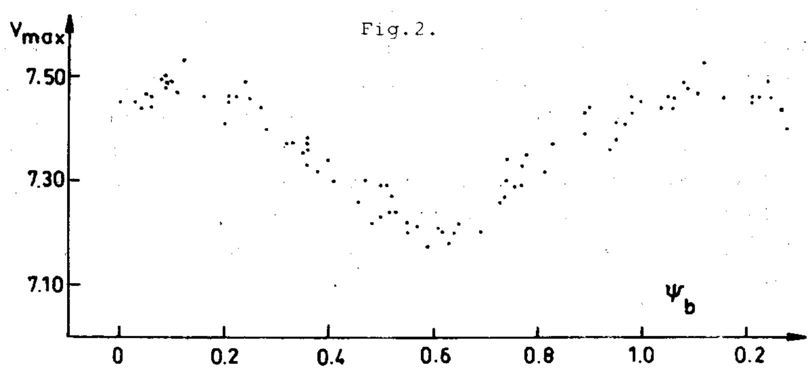

Fig.2.

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Budapest
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THE PERIOD OF THE CEPHEID CV MONOCEROTIS

During 10 nights in the interval 27 February to 10 March 1976 the Cepheid variable CV Mon was observed photoelectrically with the University of Toronto 61-cm telescope on Cerro Las Campanas. On the night of February 28/29 the variable was observed to go through a maximum, reaching V = 9.90 and B = 11.06. The estimated time of maximum light, JD 2442837.605 ± 0.025, occurred 9 hours earlier than the time expected according to the elements calculated by Wachmann (1964, Astron.Abhand. Hamburger Sternw. 7, 203). New elements for this variable are clearly needed. However, as we demonstrate here, the available observational data do not yield an unambiguous solution for these.

The newly-observed time of maximum listed above indicates that Wachmann's period of $5^d.3788$ should be reduced to $5^d.3786$. The other possible interpretation, namely that the recently-observed maximum occurred almost a full cycle late, leads to a period of $5^d.3808$. The uncertainty in both estimated periods is less than $0^d.0001$.

The period of CV Mon has also been derived by fitting the new photoelectrically-observed light curve (Turner, 1976, in preparation) to the observations of Arp (1960, Astrophys. J. 131, 322). Care was taken to insure that both sets of observations were on the same system. This analysis resulted in a period of $5^d.3790 \pm 0^d.0001$ s.e., which disagrees with both of the above estimates.

The discrepancy may result from the comparison of photographic (Wachmann) and photoelectric (Turner, Arp) observations. However, it is also conceivable that a period change has occurred for this variable. Further photoelectric monitoring of CV Mon would clearly be of value for resolving this problem.

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PHOTOELECTRIC MINIMA OF ECLIPSING VARIABLES

The following list contains minima of eclipsing variables observed at the "P. Pizzinato" Observatory of Tignano, near Bologna. All are photoelectric timings reduced using the Kwee and Van Woerden method.

The observations were made with the 400 mm ∅, f=200 cm newtonian reflector and a photometer employing an unrefrigerated IP21 photomultiplier tube.

Column "(O-C)I" was determined with elements given in "Rocznik Astronomiczny Observatorium Krakowskiego" while "(O-C)2" is referred to Cester's (1973) elements for W UMa. Column "N" denotes the number of observations. All are heliocentric minima and column "m.e." denotes the mean errors obtained by the above-mentioned method.

Star	Filter	J.D. hel 2442...	m.e.	(O-C)1	(O-C)2	N
RT And	V	317.3611	±0.0003	+0.1233		33
VW Cep	V	336.3769	.0003	-0.0172		52
VW Cep	V	353.3802	.0003	+0.0089		48
SW Lac	V	768.2821	.0001	-0.0469		29
W UMa	V	805.3714	.0004	-0.0081	-0.0012	54
W UMa	V	829.3935	.0004	-0.0080	-0.0011	64
W UMa	V	830.3940	.0001	-0.0084	-0.0015	51
W UMa	V	834.3978	.0003	-0.0083	-0.0014	47
W UMa	V	835.3990	.0002	-0.0080	-0.0011	34
W UMa	B	835.3990	.0002	-0.0080	-0.0011	34
W UMa	V	838.4018	.0001	-0.0079	-0.0010	41
W UMa	V	839.4035	.0005	-0.0071	-0.0002	72

Note: The new period of W UMa suggested by Cester (1976) is confirmed.

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Budapest
1976 June 22

APPEAL FOR PHOTOELECTRIC OBSERVATIONS OF UPSILON SAGITTARII

(α (1900) = $19^h\ 16^m\ 0^s$, δ(1900) = $-16^{\circ}\ 8.6'$, m_v = 4.58)

Upsilon Sagittarii is a remarkable spectroscopic binary. Lines of H, CaII, [CaII], FeII and [FeII] have been observed in emission in its spectrum, while Hα and perhaps two HeI lines show at certain phases a blue-shifted absorption component. The spectrum of only one component has been detected in the visible region, a spectrum which indicates an underabundance of hydrogen with respect to helium. An infra-red excess has also been observed.

Gaposchkin (1945) found this star to be an eclipsing binary, with primary and secondary eclipse depths of 0.15 and 0.08 magnitudes. This result is based on photographic measurements, and seems to have been never confirmed photoelectrically.

Observations of this star are important in the light of theories of close binary evolution. A study of far ultraviolet measurements conducted by M. Friedjung and M. Hack is in progress, and should give some information concerning the component whose spctrum is invisible in the visible region, and which is probably hotter than that seen. Photoelectric observations of colour changes during eclipses in the visible, would also be useful from this point of view. Unfortunately, this star is difficult to accurately observe from the northern hemisphere, while its relatively long period of 138 days makes it unattractive for those observatories which allocate time for short observing runs only. It is because of these difficulties that this appeal is launched.

The eclipse dates for the next 1 1/2 years are using the elements of the 1969 edition of the "General Catalogue of Variable Stars".

Primary	Secondary
October 13 1976	August 5 1976
February 28 1977	December 21 1976
July 16 1977	May 8 1977
December 1 1977	September 23 1977
	February 8 1978

A convenient comparison star is 44ρ^1 Sagittarii ($\alpha=19^h15^m52^s$, $\delta=-18^\circ02'$, 1900, V=3.94). It should be noted that all these eclipses are not observable, because of the proximity of the Sun.

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Reference:

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Budapest
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NEW VARIABLE STARS IN THE REGION OF IC 1396

For a search for young variable stars in the region of the galactic cluster IC 1396, which is associated with a diffuse emission nebula, a total of 104 blue patrol plates of a 6 x 6 square degrees field centered on μ Cep have been obtained with the astrograph of Hoher List Observatory (F/5; F = 1500 mm).The exposures on Kodak 103a-O, covering a time interval between June 1969 and October 1971, have in most cases limiting magnitudes of $17^m_.0$ to $17^m_.5$.

The comparison of 21 plate pairs with a blink microscope yielded the discovery of 32 variable objects. 13 of them are known variables named in the GCVS and Supplements (1969 to 1976), 2 of them are the suspected variables K3E 5485 and K3E 8684,designated here as No 25 and No 19, respectively, and 17 of them are new variable stars.

The light variation of these 19 unnamed variables were estimated on several plates with a number of comparison stars around each variable, which were calibrated with a secondary standard sequence. This sequence itself was derived by a photographic transfer of a UBV-sequence in the nearby galactic cluster NGC 7128 (Hoag et al. 1961, Publ. US Naval Obs. Vol.17 part 7).Because of the small angular distance of NGC 7128 this transfer could fortunately be done simply by a set of overlapping exposures.

As a result of these estimates the range of variability and the first preliminary classification of the light curves are given in columns 4,5 and 6 of the table. In column 6 "l" means slow, "s" rapid and "E" eclipsing light variations. The numbering of the variables is in continuation of an earlier work by Geyer and Gieseking (IBVS,No. 967). The position of each variable relative to 3 surrounding AGK_2-stars was measured with a Zeiss coordinate measuring machine. With these positions the corresponding coordinates were calculated by application of the dependences method. Finally, the last column of the table contains information about the colour of the variables, estimated by inspection of the blue and red prints of the Palomar Sky Survey. Here "r" and "b" means, that the star is brighter on the red or blue print, respectively, and "r=b" means, that the star has roughly the same brightness on both prints.

The identification charts of the variables, which have north up and west to the right, are enlargements from three plates and have a limiting magnitude of about 17^m.

No.	RA(1950)	D(1950)	Max	Min	type	colour
10	$21^h24^m10^s.0$	$+60^\circ38'43''$	$15^m.5$	$17^m.0$	s	r=b
11	21 28 06.1	+57 46 14	16.2	(17.5	s+1	r=b
12	21 28 37.2	+55 39 20	15.6	16.6	E?	r=b
13	21 29 47.5	+58 14 36	17.2	(17.5	?	(r)
14	21 30 00.7	+60 56 42	16.4	17.0	s	r=b
15	21 33 47.7	+57 23 15	14.4	15.4	s	b
16	21 34 05.7	+59 43 21	16.7	17.5	l	(r)
17	21 36 38.7	+57 07 41	16.3	17.1	s	r=b
18	21 39 05.0	+56 52 07	16.6	17.2	s	(r)
19	21 41 16.4	+58 43 34	14.8	(17.5	l	r!
20	21 41 59.0	+57 28 09	16.7	17.4	E?	(r)
21	21 42 55.4	+55 45 05	16.5	17.5	s	r
22	21 48 49.0	+59 22 51	14.9	16.2	E?	r=b
23	21 49 57.9	+58 32 32	16.6	17.4	E?	(b)
24	21 50 19.9	+56 24 45	15.4	17.1	s	(r)
25	21 52 14.1	+60 18 01	15.7	(17.5	l	r!
26	21 52 58.8	+58 53 04	16.0	17.1	s	r
27	22 01 02.1	+59 12 36	15.2	16.7	s	r
28	22 01 54.1	+59 55 00	15.8	(17.5	l	r!

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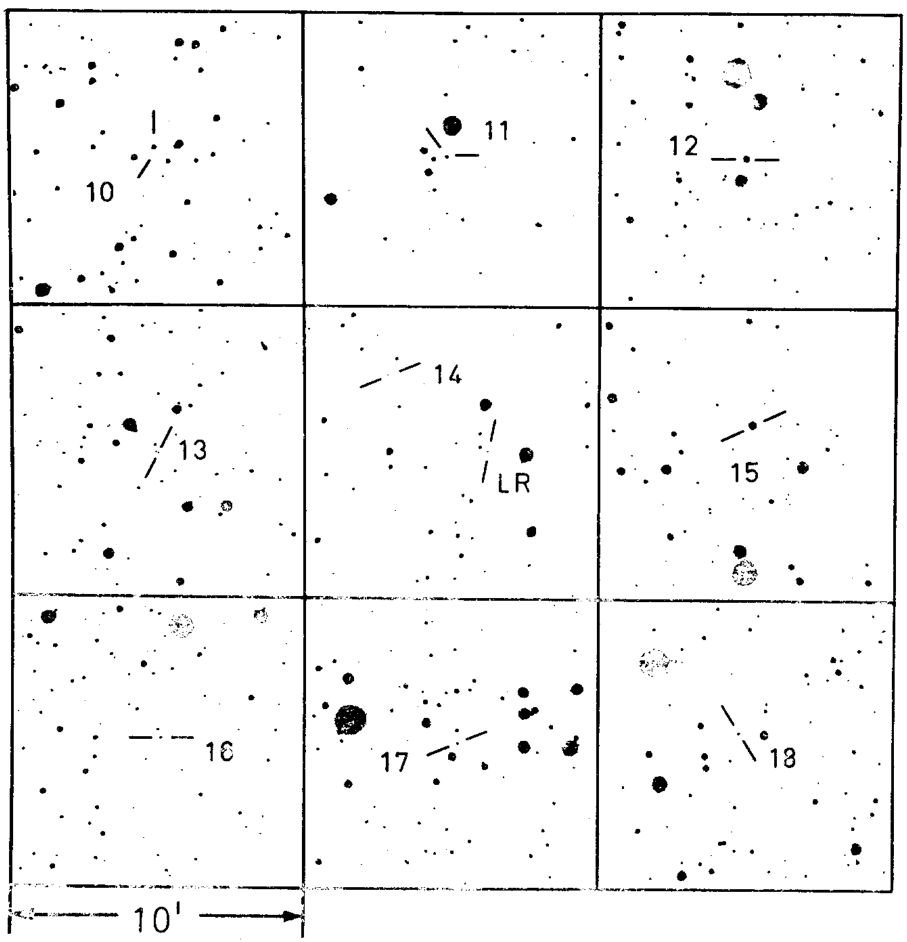

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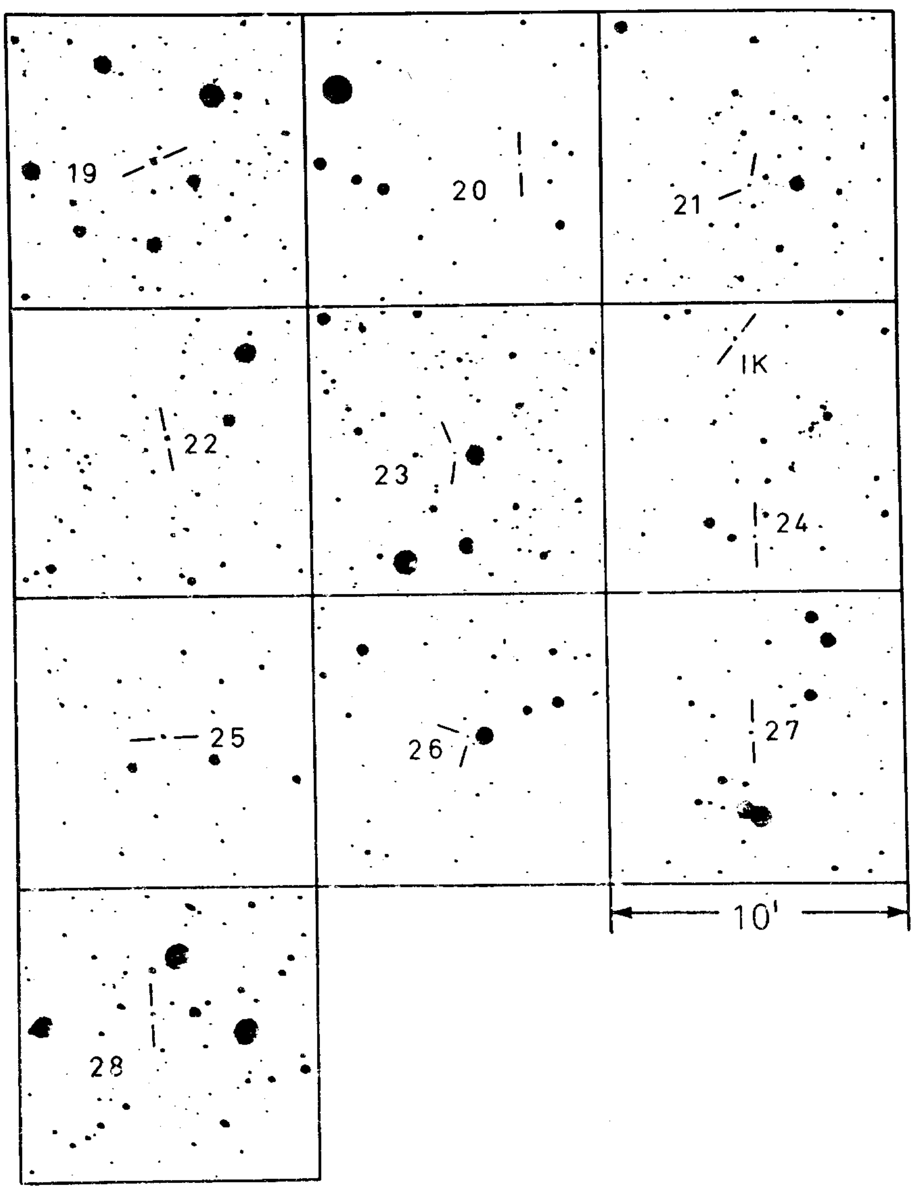
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Budapest
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THE PERIOD OF AZ CASSIOPEIAE

AZ Cassiopeiae is a long-period (9.3 years) spectroscopic-eclipsing binary, a member of the VV Cephei group. Although discovered much earlier, its type of variability was first recognized by Ashbrook in 1956, who derived the following ephemeris formula based on the Harvard plate collection: Min.=J.D. 2432484 + 3406 E, D = 112d, d = 92d. The system was neglected for some time but its latest eclipse in 1975 attracted wider attention. In the following we will present the results of measurements relevant to the 1956-57 eclipse derived from plates in the University of Oklahoma, Norman, archive. In the light of these measurements and other results, both published and unpublished, we will also discuss the period of the variable which repeatedly exhibited noticeable deviations from the predicted contact times.

1. The AZ Cas plates in the Norman collection were taken by Professor B. S. Whitney, using the 85 mm Zeiss camera and Kodak 103a0 material. They run from May 1956 to March 1957 and bracket the ingress phase, without actually covering the first or second contact. The iris-photometer measurements were based on a B-sequence selected from the Naval Observatory Photoelectric Catalogue. (Blanco *et al.*, 1968) Observations closest to the 1956 ingress phase are listed below.

	Maximum, m_b		Minimum, m_b	
J.D. (2435)	696.867	10.80	... 833.666	11.73
	696.876	10.90	833.677	11.93
	725.730	10.96	834.729	11.71
	725.796	10.97	834.741	11.82
	773.681	10.81	834.760	11.74
	773.698	11.01	838.737	11.57
	802.645	10.97	838.755	11.42
	802.658	10.93	859.616	11.64

The mean magnitude at maximum is 10.92, std. deviation ±0.09, and the mean magnitude at minimum is 11.72, std. deviation ±0.15, giving an amplitude close to the B amplitude found photoelectrically by Larson-Leander. The higher error of the minimum measurements probably indicated an increase in the level of brightness fluctuations. It can also be noted that some features of these brightness fluctuations during minimum may return with a possible regularity in that a drop in brightness immediately following second contact or immediately preceding third contact is noted in the Norman observations as well as in observations of the 1947 and 1966 eclipses.

2. The following discussion of the period is based, to a great extent, on unpublished material generously provided by Dr. J. Ashbrook (details of 5 minima from Harvard patrol plates) and by Professor P. Tempesti (photoelectric observations at Teramo, timing of ingress 1975). Further basic information concerning past minima can be found in reports by Richter (1957, 1966), Larsson-Leander (1959) and Tempesti (1968); observations by Weber at Mainterne were not available to us.

Instead of estimating the contact times, we considered the mid-points of the ingress and egress partial phases ("mid-ingress" and "mid-egress") and constructed separate O-C curves for them. The mid-points are defined as being equidistant in magnitudes from the maximum and minimum brightness. This procedure has already been applied to Zeta Aur (Herczeg, 1956, Hardorp *et al.,* 1966) and seems particularly well suited in the case of AZ Cas, where among the 8 eclipses observed since 1901, only one (1947) gave reliable information on both egress and ingress. We are well aware of a possible pitfall: the run of the eclipses (partial phases) is somewhat different in different colors. The significant discrepancy lies, however, between U and B, not between B and V; this is clearly indicated by the behavior of the similar systems, Zeta Aur, 31 and 32 Cyg. For AZ Cas, most of the photographic and B observations suggest a duration of the partial phase around 10 d, while the photoelectric V observations of the last three eclipses show a somewhat shorter, 8d duration. Thus, the error in our determination of the mid-partial phases is about 1 day at most and in all likelihood considerably less.

We also made a limited use of those series, both photographic and photoelectric, which failed to indicate the mid-eclipse point. In these cases, observations taken clearly at maximum or minimum usually define a possible interval for the mid-point, bracketing it. Using the previously discussed limits on the duration of the partial phase, such a bracket can be improved by taking t_1+4 and t_2-4 instead of t_1 and t_2. It is clear that the "mid-points" do not necessarily fall halfway between the epochs of the corresponding contacts. The photoelectric observations actually show them shifted by about 1 day toward the 2nd and 3rd contact. This shift is hardly noticeable photographically but a small systematic error in the table below and in the figure can arise as a result.

We derived epochs or brackets for the mid-epochs from all observations. Ascribing E = 0 to the well covered 1947 eclipse, the following tables of residuals were constructed, using Ashbrook's period, P = 3406 days.

Mid-ingress:

E = -5	O = (24)15405± 5	O-C = -3 to +7	Harvard (1 obs.)
-2	25603 to 622	-18 to +1	Harvard
-1	>29019	>-9	Sonneberg (1 obs.)

E = 0	32433±2	0(def.)	Harvard
+1	35806 to 829	-33 to -10	Norman
+2	39225 to 230	-20 to -15	Sonneberg; Teramo (phe)
+3	42640±1	-11	Teramo (phe)
Mid-egress:			
E = -3	0 = (24)22298 to 318	0-C = -17 to +3	Harvard
-1	29124 to 127	-3 to 0	Harvard
E = 0	32533±1	0 (def.)	Harvard
+1	35933±1	-6	Lund (phe)
+2	39335±1	-10	Teramo (phe)

Comparison with the Harvard observations show that in 1947 the apparent decline on the Sonneberg plates after 2432415 was merely a fluctuation and the eclipse did not begin until J.D. 2432430. This may explain the low value of the period, 3397d, deduced earlier from Sonneberg material.

From the tables above, two pieces of useful information can be extracted:

A. Ashbrook's ephemeris represents all earlier eclipses (E=-5 through E=0) quite satisfactorily.

B. The same formula certainly fails for the more recent eclipses. These can be represented in an acceptable way by a new ephemeris formula we propose;

Min. = J.D. 2432483 + 3402 E ($E \geq 0$); D = 110d, d = 90d .

This new formula is equivalent with the statement that in or around 1947 the period abruptly changed by -4 days (see fig.). As 32 Cyg may have exhibited similar behavior (Doherty 1967, Wright 1970) and considering the strongly interacting nature of the AZ Cas system, this is by no means an implausible proposal.

It can be noted that the erratic behavior of the system makes exact prediction of the eclipses difficult. For example, mid-ingress for 1956 is predicted by our formula to have occurred on J.D. 2435835. Norman observations show beyond doubt that the B-component was already completely eclipsed on J.D. 2435833, indicating that mid-ingress occurred at least 6 days earlier. The occurrence of a significantly early ingress in 1966 is also well documented.

For the 1975 eclipse our formula gives: mid-egress JD. 2442739, that is, third contact: Nov. 17±1, forth contact: Nov. 27±1.

We should like to thank all colleagues who helped us.

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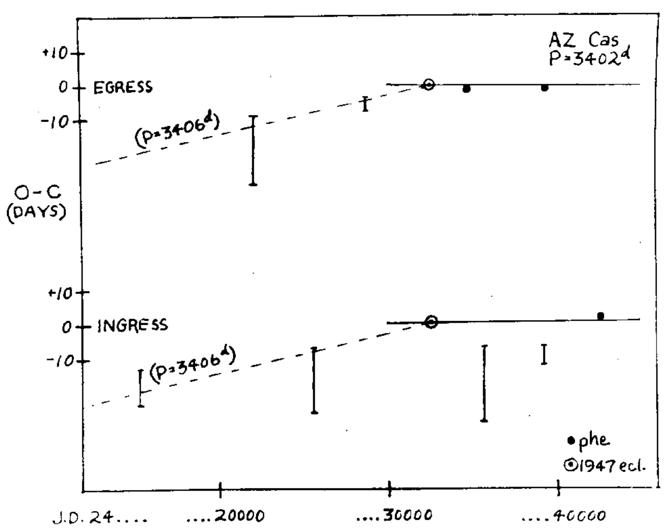

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Hα EMISSION IN THE ECLIPSING WHITE DWARF V471 Tau (BD+16°516)

Spectroscopic observations of the eclipsing white dwarf V471 Tauri (BD+16°516) were obtained at the coudé focus of the Mt. Wilson 2.5 meter telescope during the 1975-76 season. The exposures were taken on IIa-D emulsion plates with the 81 cm camera in combination with an S25 cathode Varo image tube at a dispersion of 6.5 Å/mm.

Hα emission was detected on the plate obtained JD 2442702.89. The phase of the binary orbit at mid exposure was ~0.524, following the elements of Young and Lanning (1975). The two hour exposure is weak and the Hα feature broadened by orbital motion (Period ~12.5 hours) making a study of the line impractical.An additional plate on JD 2442800.71, phase ~0.212, showed marginal evidence of Hα in emission.

Cester and Pucillo (1976) have suggested the presence of circumstellar matter around V471 Tau from a study of the photometric variability of the binary. Photometric observations by one of us (HHL) confirm those obtained by Cester and Pucillo. These data, together with the detection of Hα emission presented here, and the period variations noted by Young and Lanning, may add support to their hypothesis. Photometric variations on time scales of 30-60 days have been observed by HHL suggesting the occurrence of chromospheric activity, and may indicate the source of the Hα emission. Emission of singly ionized Calcium presumed to result from a transient event has also been observed by Young and Nelson (1972). Unfortunately, no simultaneous photometric and spectroscopic observations have succesfully been obtained during any of these events.

Coordinated spectroscopic (CaII and Hα) and photometric observations are clearly needed to determine the nature of the observed emission and photometric variability.

We wish to thank Dr. Horace Babcock, Director of Hale Observatories, for the allocation of observing time on the 2.5 meter telescope of the Mt. Wilson Observatory.

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and

PAUL B. ETZEL
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References:

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Konkoly Observatory
Budapest
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ON THE SECONDARY MINIMUM OF θ^1 Ori A

Photoelectric observations of θ^1 Ori A were obtained on 21 March 1975, starting at 0332 UT. This is within the time predicted for the secondary minimum (W.A.Feibelman 1975).
Eight UBV observations obtained with the 1 meter Ritchey-Chretien telescope at the Flagstaff Station of the Naval Observatory failed to show a decrease in light from normal.

A 13".39 aperture was used, θ^1 Ori D was monitored as a comparison star, sky readings were taken 15" west of A in the nebulosity, and observations were terminated by clouds. As can be seen below, where the observations are grouped in three means, differential photometry was not needed to demonstrate that the light did not vary by more than the error of each mean.

JDH 2440000.0+	θ	V	B-V	U-B	n
2858.6465	195.559	6.72±0.03	0.03±0.00	-1.00±0.02	3
2858.6569	195.578	6.74±0.04	0.03±0.01	-1.00±0.01	3
2858.6694	195.601	6.73±0.04	0.03±0.02	-0.99±0.02	2

The values of θ were computed using the light elements below which were derived from data by E.Lohsen (1975a, 1976b) and K.Aa. Strand (1975).

$$T_o = 244\ 1966.826 \pm 196.297 \cdot E.$$

Feibelman predicted the secondary minimum to extend to $\theta=196^o$. The above observations do not support this, but do confirm visual observations reported by Lohsen (1976b).

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1976 July 7

TY MENSAE

The variability of TY Men (BV 457) was discovered on Bamberg patrol plates by Strohmeier et al. (1964). Later Schöffel and Mauder (1967), Austin et al. (1975), and more recently Naqvi and Grønbech (1976) studied this W UMa type binary in different photometric systems. We also observed TY Men between 1972 and 1975 at the Bosque Alegre Station of Cordoba Observatory with the 1.54 m reflecting telescope. From 363 photoelectric U, B, and V observations we obtained 15 times of minimum; they are listed in Table I together with three epochs of primary minima published by the authors quoted above. The residuals (O-C) and epochs E are from the following improved linear ephemeris:

$$\text{JD hel.Min.I} = 2442054^{d}.7961 + 0^{d}.46166602 \cdot E$$
$$\pm.0008 \quad \pm.00000051$$

from which the phases of the observations were computed.

The differential light curves UBV are shown in Figure 1; the magnitude differences are in the sense variable star-minus-comparison star (HD 37134). The three light curves show an asymmetry at the bottom of primary minimum and a clear difference between the maxima; the mean values of Max II - Max I for December 1974 - January 1975 are :

$$\Delta V = 0^{m}.036 \qquad \Delta B = 0^{m}.041 \qquad \Delta U = 0^{m}.028$$

Naqvi and Grønbech (c/f above) observed variations in the maxima at different epochs. The system will be observed again in the next observing seasons in order to detect the behaviour of these asymmetries.

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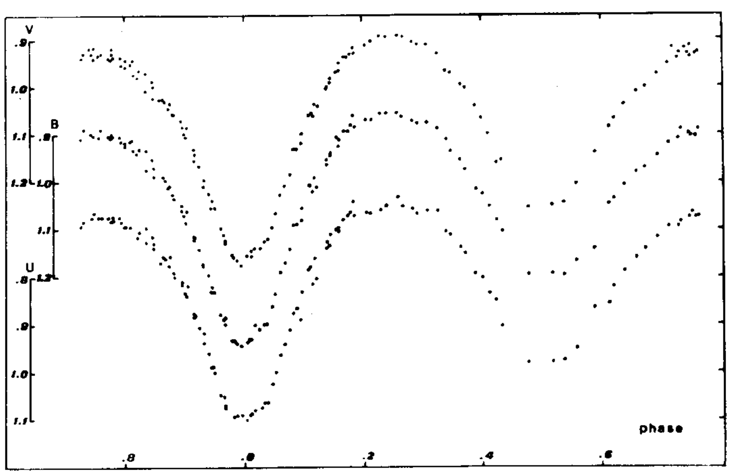
Table I

Times of minimum of TY Mensae

Min.	Color	JD hel.	E	(O-C)	Author
I		2439451.459	-5639.0	-0.002	Schöffel&Mauder
I		2441353.986	-1518.0	-0.001	Austin et al.
II	V	1587.8250	-1011.5	0.0041	Lapasset
	B	1587.8278	-1011.5	0.0069	"
	U	1587.8267	-1011.5	0.0058	"
I	V	1589.8952	-1007.0	-0.0032	"
	B	1589.8954	-1007.0	-0.0030	"
	U	1589.8981	-1007.0	-0.0003	"
I		2054.797	0.0	0.001	Naqvi&Grønbech
I	V	2319.7909	574.0	-0.0015	Lapasset
	B	2319.7880	574.0	-0.0044	"
	U	2319.7903	574.0	-0.0021	"
I	V	2403.8166	756.0	0.0010	"
	B	2403.8160	756.0	0.0004	"
	U	2403.8156	756.0	0.0000	"
I	V	2404.7387	758.0	-0.0002	"
	B	2404.7382	758.0	-0.0007	"
	U	2404.7385	758.0	-0.0004	"



References:

Austin, R.D., De George, M.,and Fleck, R. 1975 IBVS No.1013
Naqvi,S.I.H. and Grønbech,B. 1976 Astron.and Astrophys. 47, 2
Schöffel, E. and Mauder, H. 1967 Veröff.Remeis-Sternw.Bamberg VII, 60
Strohmeier, W., Knigge, R. and Ott, H. 1964 IBVS No. 66

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1150

Konkoly Observatory
Budapest
1976 July 12

REVISED ELEMENTS OF ECLIPSING STARS

The following eclipsing stars were not observed for more than two decennia(SAC 47, p. 88-98; 1975). From observations on Sonneberg patrol plates taken between 1937 and 1975 revised elements could be derived (n = number of minima).

SY And	: Min.=$2436961^{d}.11$ +$34^{d}.90847$ .E,	n=16	
CD Aqr	: Min.=2424340.34 + 4.837717.E,	n=33	
V788 Cyg:	Min.=2426620.54 +23.92435 .E,	n=22	
VV Mon	: Min.=2426037.365+ 6.05056 .E,	n=26	
AR Mon	: Min.=2426606.585+31.20812 .E,	n=41	
AU Mon	: Min.=2432888.554+11.11299 .E,	n=21	
IL Mon	: Min.=2432232.825+ 4.02631 .E,	n=20	(D=$6^{h}.5$, d=3^{h})
DN Ori	: Min.=2435577.20 +12.96641 .E,	n=13	
EY Ori	: Min.=2427310.42 +16.78786 .E,	n=15	

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1151

Konkoly Observatory
Budapest
1976 July 12

ON THE DECREASE OF THE ULTRAVIOLET FLICKERING OF T CORONAE BOREALIS

We have observed the recurrent Nova T CrB in the ultraviolet using pulse counting photometers and the instrumentation at the 122 cm telescope of Asiago (see Bernacca et al., 1973). We have six nights of observations in May and June 1975 and June 1976(three nights each year, a total of 11 hours of observation). This year's data, taken with the two channel photometer, show a marked lack of the flickering reported earlier by Walker (1957) and seen also from Asiago in 1975.

The table below lists the observers' name, dates, Julian Days, orbital phases ϕ (according to Kraft, 1958), rough estimates of the average amplitude $\bar{a}$ of the flickering (in magnitudes), the maximum variation A (in magnitudes),the average interval t between maxima and the duration T of each night's observation.

Observer	Date	J.D.	ϕ	$\bar{a}$	A	t	T
Walker	29 May 1954	2434893	0.51	0.106	0.49	3.5	106
Walker	1 Jun 1954	2434895	0.52	0.072	0.28	4.0	100
Bianchini	16 May 1975	2442549	0.14	0.1	0.35	3.5	100
Bianchini	30 May 1975	2442563	0.21	0.1	0.42	3.5	100
Bianchini	4 Jun 1975	2442568	0.23	0.089	0.30	3.75	137
Middleditch-Bianchini	18 Jun 1976	2442948	0.90	0.05	0.10	3.5 (6.7)	68
Middleditch-Bianchini	20 Jun 1976	2442950	0.91	0.05	0.10	~4	171
Middleditch	21 Jun 1976	2442951	0.91	0.030	0.10	~4	137

Fourier analysis of the last five nights data reveals no consistent periodicities to below 0.005 magnitudes, although the data taken on 4 June 1975 and 18 June 1976 tend to indicate 3.6-minute and 6.7-minute components.Kraft's epoch for ϕ=0 (J.D. 2432046.0) corresponds to the blue star being nearer to the Earth. The lack of flickering at phase 0.9 can be explained in two different ways. The first explanation has the blue star itself with a hot variable spot on its surface which is visible at $\phi=0.14$ and $\phi=0.5$ but occulted by the star at $\phi=0.9$, contrary to the currently accepted theory fixing the flickering at the stream-disk intersection which should be visible at $\phi=0.9$ according to Kraft's inclination of 68°.

The second hypothesis considers the red giant star not filling, at present, its Roche-lobe. Each of these two explanations would naively predict a decrease in the average U light of at least 0.2 magnitudes which has not been observed. Further U observations should help.

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JOHN MIDDLEDITCH
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of the University of Padua

References:

Bernacca,P.L., et al.: 1973, Asiago Scientific and Technical Report No.1
Kraft,R.P.: 1958, Astrophysical Journal 127, 625
Walker,M.F.: 1957, IAU Symposium No. 3, 46

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1152

Konkoly Observatory
Budapest
1976 July 14

ON THE PERIODIC VARIATION IN PERIOD OF SIX RR LYRAE TYPE STARS

We have found periodic fluctuations of the O-C residuals in the following RR Lyrae type stars:

RV CrB $-\Pi \simeq 18400^d$
RR Gem $-\Pi \simeq 25600^d$

The change of the O-C residuals for three other stars (RW Dra, SZ Hya, SV Eri) also indicates a possible periodicity in period variation.

For RV CrB and RR Gem preliminary calculations have been made assuming that these RR Lyrae type stars are components of binary systems. However, this attempt of interpretation cannot be considered satisfactory as the mass sum of the components of suspected binary systems amounts to as high as: $m_1+m_2 \simeq 10^2-10^3$ of the Sun's mass.

Similar variations in period might be caused by dynamic factors.

In figures below the graphs of the O-C fluctuations through the following time intervals are given:

RV CrB	-	J.D. 2417800-2442800
RR Gem	-	J.D. 2415000-2442800
RW Dra	-	J.D. 2417400-2442700
SZ Hya	-	J.D. 2415000-2442800
SV Eri	-	J.D. 2414000-2441700

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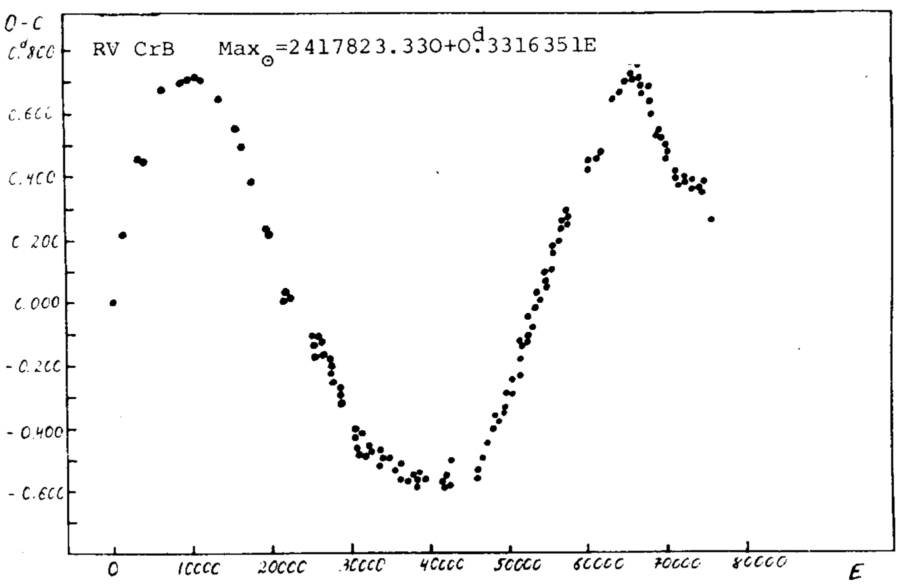
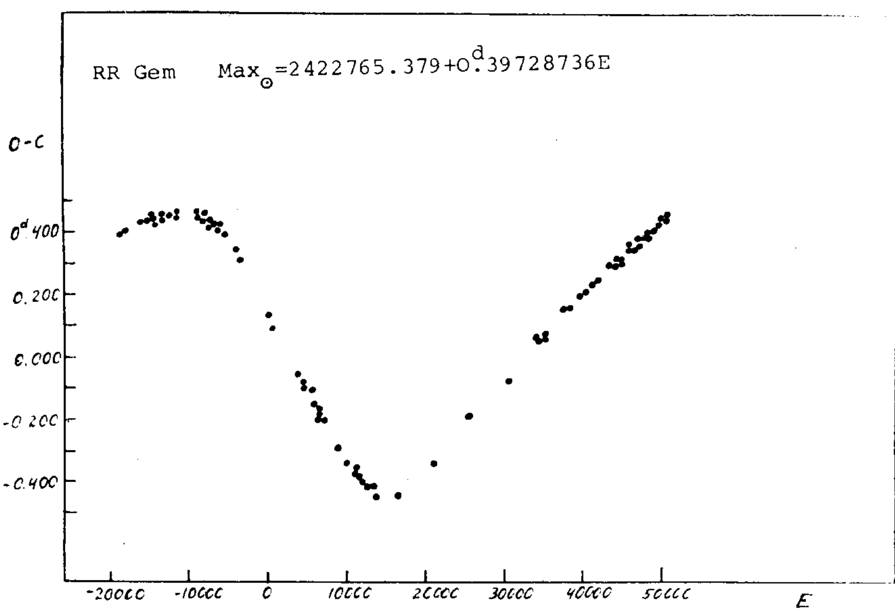
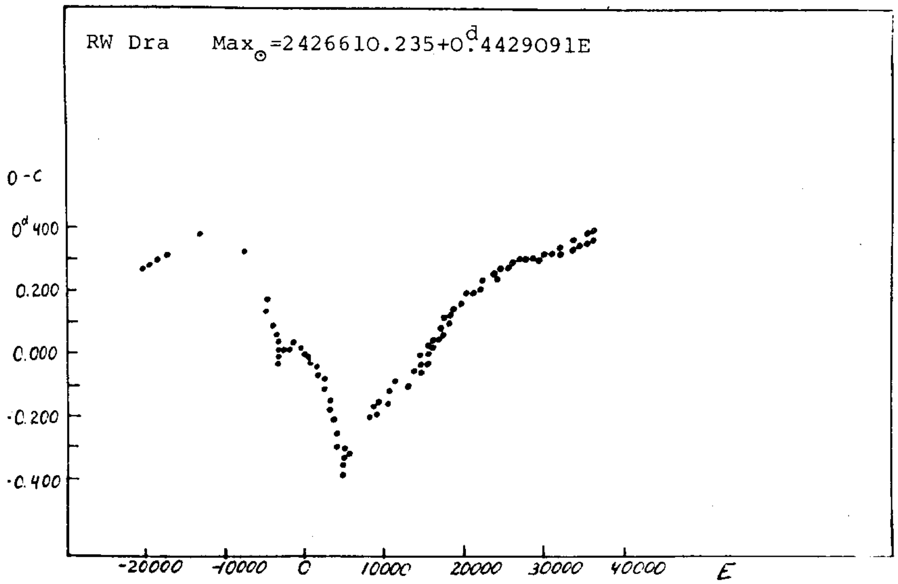
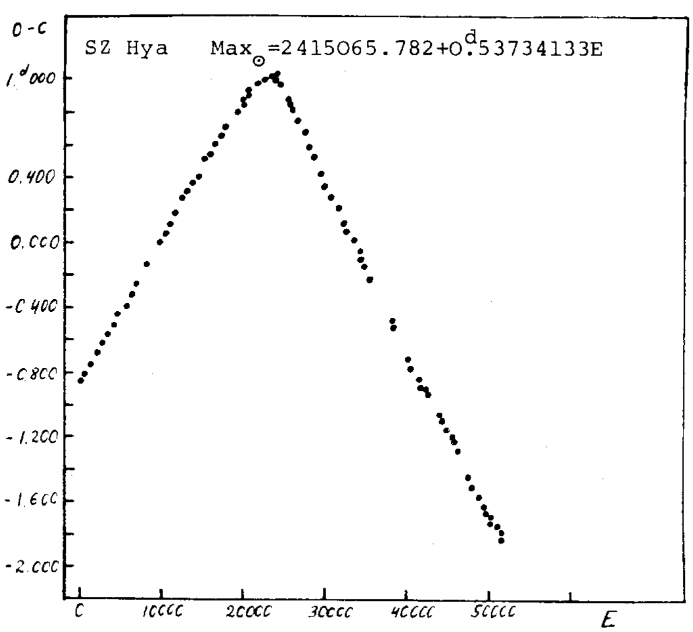
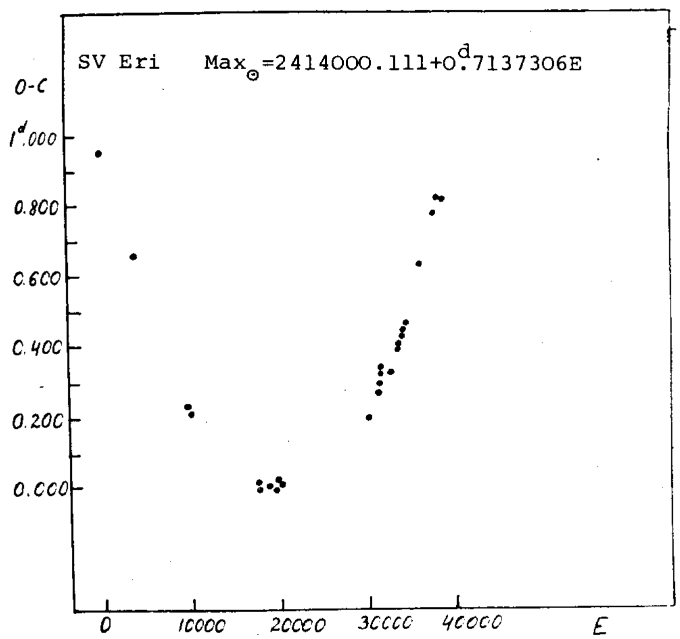

O-C
RV CrB Max$_{\odot}$=2417823.330+0.^{d}3316351E
0.^{d}800
0.600
0.400
0.200
0.000
-0.200
-0.400
-0.600
0
10000
20000
30000
40000
50000
60000
70000
80000
E


RR Gem Max$_{\odot}$=2422765.379+0.^{d}39728736E
O-C
0^{d}400
0.200
0.000
-0.200
-0.400
-20000
-10000
0
10000
20000
30000
40000
50000
E


RW Dra Max$_{\odot}$=2426610.235+0^{d}.4429091E
0 - C
0^{d} 400
0.200
0.000
-0.200
-0.400
-20000
-10000
0
10000
20000
30000
40000
E


0 - C
SZ Hya Max$_{\odot}$=2415065.782+0^{d}.53734133E
1.^{d}000
0.400
0.000
-0.400
-0.800
-1.200
-1.600
-2.000
0
10000
20000
30000
40000
50000
E



SV Eri
Max$_{\odot}$=2414000.111+0^{d}.7137306E
O-C
1^{d}.000
0.800
0.600
0.400
0.200
0.000
0
10000
20000
30000
40000
E

COMMISSION 27 OF THE I. A. U.
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Number 1153

Konkoly Observatory
Budapest
1976 July 14

Hβ OBSERVATIONS OF NOVA CYGNI 1975

Hβ photoelectric observations of Nova Cygni 1975 were made at Villanova University Observatory during the period 8 September 1975 to 7 December 1975. The observing instrumentation consisted of the 38 cm telescope and photoelectric photometer equipped with an uncooled EMI 9558 QB photomultiplier tube. The sensitivity of the system was monitored by observations of an internal Sr 90 Cerenkov light source. Interference filters, of both narrow and intermediate bandpass, centered near the wavelength of the Hβ line, were used for the observations. The characteristics of these filters have been tabulated by Guinan and McCook (1974). Note that the Hβ filter is similar to that utilized by Crawford (1960) to define the Hβ system.

BD +47^{o}3292 (m_v=4.6) was chosen as the comparison star, while BD +47^{o}3348 (m_v=6.3) served as the check star to monitor the constancy of the comparison star. For observations made after 7 October 1975, this situation was reversed, with BD +47^{o}3348 acting as the comparison, and BD +47^{o}3292 acting as the check. This was necessitated by the large decrease in magnitude of the nova during the observation period. On several nights, differential magnitudes were obtained for the two reference stars in both filters and the appropriate correction applied to the post 7 October 1975 observations, thus referencing all (v-c) calculations to BD+47^{o}3292. The effects of atmospheric extinction were removed from all observations. No significant variations were noted between the reference stars.

Figure 1 presents the nightly mean differential magnitudes, computed as (v-c) = (Nova Cygni 1975 - BD +47^{o}3292), obtained with the Hβ narrow (Hβ n) and the Hβ intermediate (Hβ w) filters, plotted against Julian Date. The change in magnitude during the period plotted (9 September 1975 to 11 November 1975) amounted to a decline of $2^{m}_{\cdot}88$ in the Hβ w filter and $3^{m}_{\cdot}86$ in the Hβ n filter. Figure 2 is a plot of the nightly mean Hβ index versus

Julian Date. This index is expressed in magnitudes and is computed in sense:

$$H\beta \text{ index} = H\beta\ n - H\beta\ w$$

The author wishes to acknowledge J. Buckley, L. Casswell, P. Miskinis, K. Rahlfs, and D. Routsis for their observations of Nova Cygni 1975, and Dr. George P. McCook, under whose direction this project was conducted.

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References:

Crawford, D.L. 1960, Ap. J., 132, 66.
Guinan, E.F. and McCook, G.P. 1974, P.A.S.P., 86, 947.

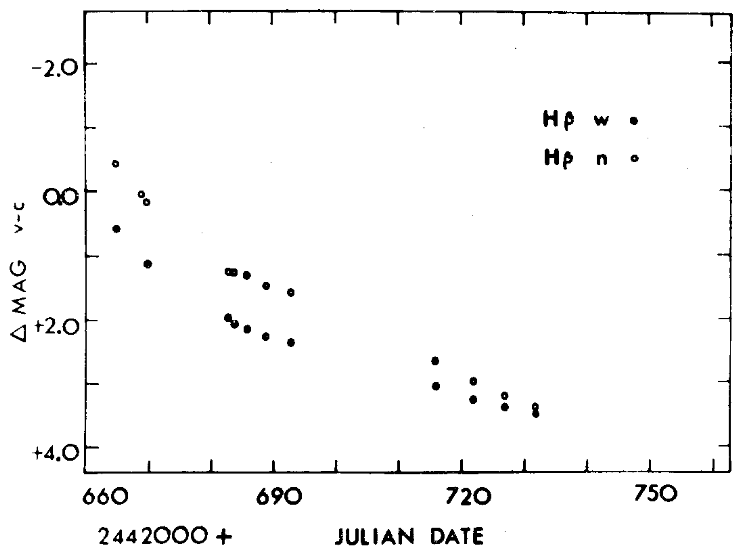

Fig.1. Nightly mean differential magnitudes (v-c) vs. Julian Date, for both Hβn and Hβw filters.

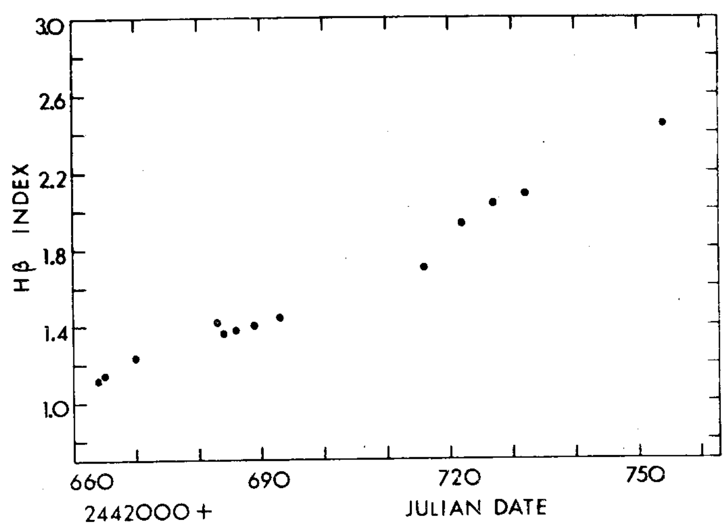

Fig.2. Nightly mean Hβ index vs. Julian Date. Note that the index is expressed in magnitudes and Hβ emission decreases as index becomes more positive. This index is computed as Hβ index = Hβn-Hβw, and due to the 180 A half-bandwidth of the Hβw filter, also reflects changes in the continuum around the Hβ line, as well as changes in the line itself.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1154

Konkoly Observatory
Budapest
1976 July 20

ON THE PERIOD OF THE ECLIPSING BINARY UX Mon

The eclipsing binary UX Mon (BD $-7^{\circ}2291$) was observed photoelectrically by the writer (Scaltriti 1973) during the winter 1972-73 with a yellow filter at the Astronomical Observatory of Torino and at McDonald Observatory with a V filter. The system is very interesting owing to the long-time changing features shown by the lightcurve, probably due to an intrinsic variability of the hotter component together with masses of gas flowing between the components whose evidence was pointed out by Struve (1947).

A study of the period was made by Whitney (1956) who concluded that the period was not constant.

From my observations, I obtained the following epoch of minimum light: $Min_I(Hel.) = 2441719.203 \pm 0.006$.

Most of the available epochs of primary minimum of UX Mon are listed by Whitney (1956). We may add the following ones, I could find in the literature:

2427536.506	(pg)	(Gaposchkin 1953)
35129.722	(ph)	(Lynds 1956)
36227.992	(ph)	(Whitney 1959)
36635.383	(ph)	(Whitney 1959)
41719.203	(ph)	(Present work)

Figure 1 represents the (O-C)'s of all the known epochs with respect to the ephemeris:

$$Min_I\ (Hel.) = 2433346.566 + 5^{d}.904574 \cdot E$$

Note the extremely high value of the (O-C)'s for the epoch given by Soloviev (1943).

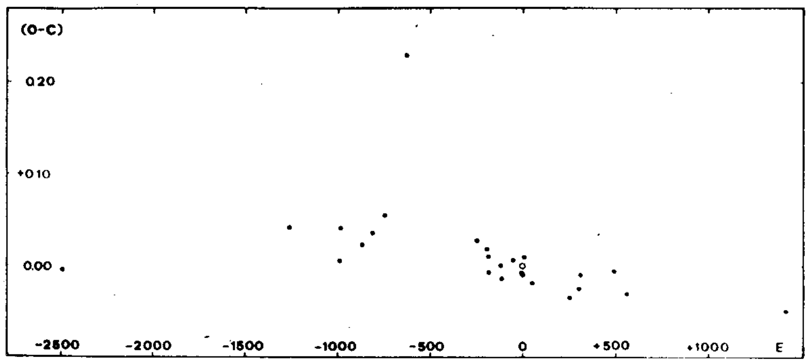

Figure 1. (O-C)'s of the epochs of minimum light of UX Mon with respect to the ephemeris:

$$Min_I(Hel.) = 2433346.566 + 5\overset{d}{.}904574 \cdot E$$

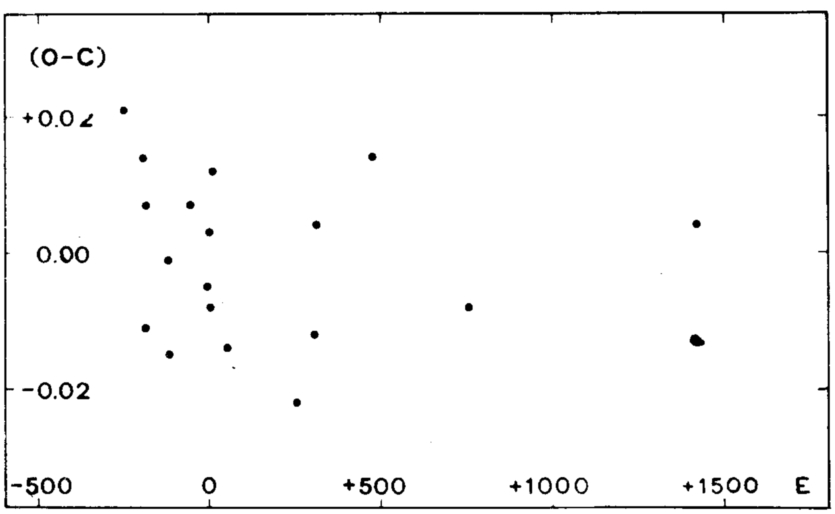

Figure 2. (O-C)'s of the epochs of minimum light of UX Mon (E> -300) with respect to the ephemeris:

$$Min_I(Hel.) = 2433346.563 + 5\overset{d}{.}904539 \cdot E$$

It seems that at least two changes in the period occurred; the first one (if real) is abrupt, at about E = -650; moreover the period before E $\cong$ -700 is longer than after E $\cong$ -700. It can be noticed that for E> -300 the epochs are well satisfied by a linear ephemeris; a weighted least-squares solution gives:

$$\mathrm{Min}_{I}(\mathrm{Hel.}) = 2433346.563 + 5\overset{d}{.}904539 \cdot E$$
$$\pm.\;\;2 \qquad \pm.\;\;\;\;4$$

The corresponding (O-C)'s are shown in Figure 2.

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References:

Gaposchkin, S. 1953 Harvard College Annals, 113, No. 2.
Lynds, C.R. 1956 Publ. Astron. Soc. Pacific, 68, 339.
Scaltriti, F. 1973 Mem.S.A.It., Vol. XLIV, 387.
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1155

Konkoly Observatory
Budapest
1976 July 22

A NEW RR LYRAE STAR IN COMA BERENICES

Wing (1973) published a photoelectric sequence for the radio-source ON 231. We have found (Véron and Véron 1975) than star F of this sequence is variable; from the color of this object measured by Wing (B - V = 0.35, U - B = .09), the amplitude and rate of change, we have suggested that it is an RR Lyrae.

Between May 1972 and May 1976, we got a total number of 40 plates of this field on which star F could be measured; 9 with the one meter (f/7) Ritchey-Chrétien telescope of the Wise Observatory, located at Mitzpe-Ramon, Israel and 31 with the franco-belgian (60/210) Schmidt telescope of the Haute-Provence Observatory. The r.m.s. uncertainty for the first set of plates is σ = 0.007 mag., for the second, it is σ = 0.12. We have analysed these data using the autocorrelation method developed by Lafler and Kinman (1965); we obtained,by this way, a period P = 0.64527 day. The light curve is shown in Figure 1, its shape confirms that this star is indeed an RR Lyrae.

The position of the star is:

$$\alpha = 12^h19^m08^s.8 \qquad \delta = +28^\circ31'48'' \ (1950.0)$$

M.P. VÉRON and P. VÉRON
Observatoire de Meudon

References:

Lafler,J., Kinman,T.D. 1965, Astrophys.J. Suppl. 2, 199.
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Wing,R.F. 1973, Astron.J. 78, 684.

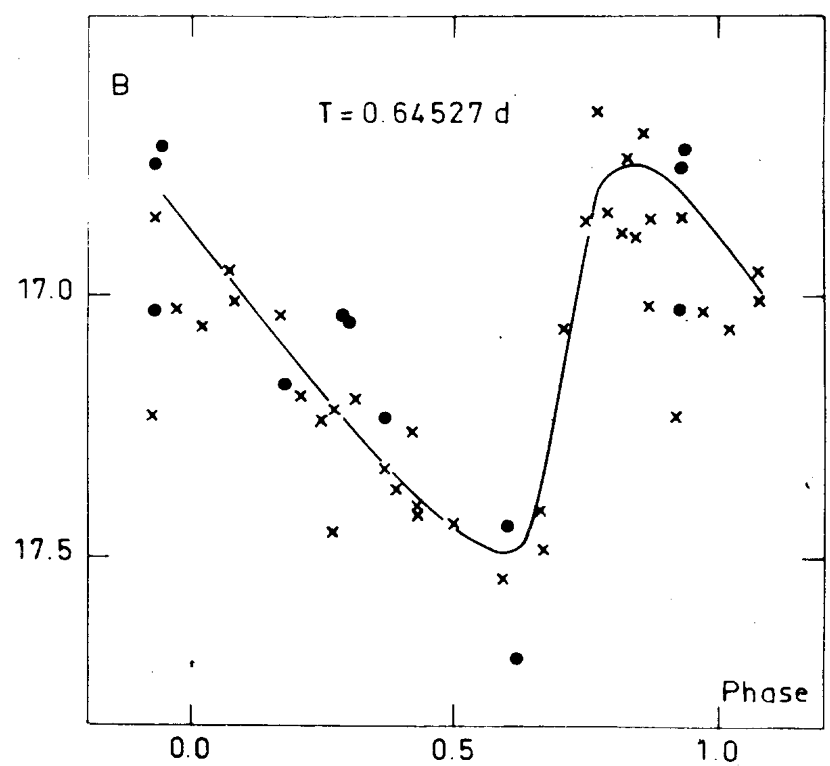

Figure 1.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1156

Konkoly Observatory
Budapest
1976 July 23

B2 1101+384: VARIABILITY AND COMPARISON STARS

Photoelectric UBV observations of the object B2 1101+384 have been carried out with the 60 cm reflector (Lyutyj, 1971) of the Sternberg Institute Crimean Station with the purpose of detecting a short time variability. BD$+39^\circ 2407$ (Klemola, 1962) was used as the comparison star, SSII-5 (Eggen, Sandage, 1965) - as the check star. The observed magnitudes were transformed to Johnson's system. The values of V, (B-V) and (U-B) for B2 1101+384 together with the dates are given in Table I. The accuracy of the observations (Tables I, II) is $\pm 0\overset{m}{.}02$ (for V and B-V) and $\pm 0\overset{m}{.}03$ (for U-B).

Continuous observations in B-band were made on Jan. 7 and Feb. 3, 1976 with integration time 40 sec. Considerable variability was not detected for 110 min. observation, although quasi-periodic fluctuations with amplitude $0\overset{m}{.}05$ and time scale about 20 min. are not impossible.

UBV magnitudes of six comparison stars (see Table II) were also obtained. Designations of the stars coincide with those in the work of Veron, Veron (1975). Nine plates were measured using this standard sequence. The photographic B values are listed in Table III with the dates, mean errors and telescopes used. The comparison of photographic and photoelectric observations shows a variability of B2 1101+384 about 1^m. The observations during JD 2442740-840 are of great interest. There was a flare with the change of brightness rate about $0\overset{m}{.}5$ in 3 days. Similar change was also found by Miller (1975).

G.V. ZHUKOV

Engelhardt Observatory

References:

Eggen O.J., Sandage A.R., 1965, ApJ 141, 821.
Klemola A.R., 1962, AJ 67, 740.
Lyutyj V.M., 1971, Sternberg Inst. Reports, 182, 30.
Miller H.R., 1975, ApJ 201, L109.
Veron P., Veron M.P., 1975, Astron. and Astrophys. 39, 281.

Table I.

Date	JD	V	B-V	U-B
1975. Dec. 31	2442778.474	$13^{m}.09$	$+0^{m}.53$	$-0^{m}.64$
	.481	13.16	0.50	0.66
	.488	13.06	0.55	0.68
1976. Jan. 7	785.421	13.04	0.45	0.70
	.447	13.04	0.45	0.59
	.459	13.07	0.46	0.66
Feb. 3	812.419	13.20	0.50	0.66
	.451	13.22	0.55	0.69
	.583	13.20	0.51	0.57
	.633	13.26	0.47	0.57
Feb. 4	813.480	13.24	0.49	0.66
	.486	13.21	0.51	0.65

Table II.

No	V	B-V	U-B	Notes
1	$14^{m}.39$	$+0^{m}.56$	$-0^{m}.04$	
2	12.88	+0.71	+0.11	
3	13.57	+0.89	+0.24	var ?
4	11.86	+0.52	-0.17	
6	12.03	+0.89	+0.39	
7	12.69	+0.84	+0.30	

Table III.

JD	B	σ	Notes
2441739.198	$13^{m}.35$	$\pm 0^{m}.10$	1
42424.427	12.63	0.10	1
432.328	12.75	0.09	1
487.358	13.04	0.15	2
749.490	13.43	0.07	3
.509	13.26	0.14	3
759.510	12.94	0.20	3
774.487	12.92	0.05	3
843.406	13.71	0.15	2

1 - 38 cm Schmidt telescope of the Engelhardt Observatory.
2 - 35 cm meniscus telescope of the Engelhardt Observatory.
3 - 50 cm meniscus telescope of the Sternberg Institute, Crimean Station.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1157

Konkoly Observatory
Budapest
1976 July 26

CHANGES IN PERIOD OF SHORT TERM VARIABILITY OF NOVA V1500 CYGNI

We report new photometric observations which confirm the suggestion made by one of us (Semeniuk 1975) that the short term variability period of Nova V1500 Cygni is variable.

The observations were made photoelectrically in V filter with the 60 cm reflector of the Ostrowik station of the Warsaw University Observatory in December 1975 and from May to July 1976. Basing on these observations the following times of minima and maxima were obtained:

MINIMA

$JD_{\odot}2442000+$	$JD_{\odot}2442000+$	$JD_{\odot}2442000+$
758.244	919.495	952.460
759.234	938.464	954.399
765.225	939.461	961.437
765.369	940.426	962.404

MAXIMA

$JD_{\odot}2442000+$	$JD_{\odot}2442000+$	$JD_{\odot}2442000+$
757.326	938.413	955.445
759.305	940.500	956.415
765.297	951.408	962.482
937.441	954.465	963.446

The short term light variability was always well expressed with roughly symmetrical and nearly sinusoidal light curve of variable amplitude. In December 1975 the amplitude was around 0.04 mag but in May to July 1976 it was generally higher and varied from night to night between 0.04 and 0.12 mag.

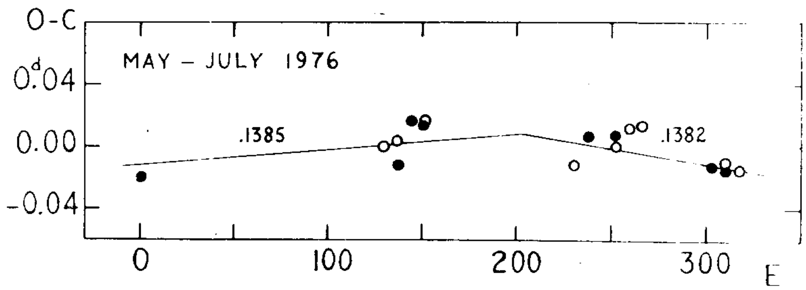
O-C
0.04
0.00
-0.04
MAY – JULY 1976
.1385
.1382
0
100
200
300
E

Fig. 1

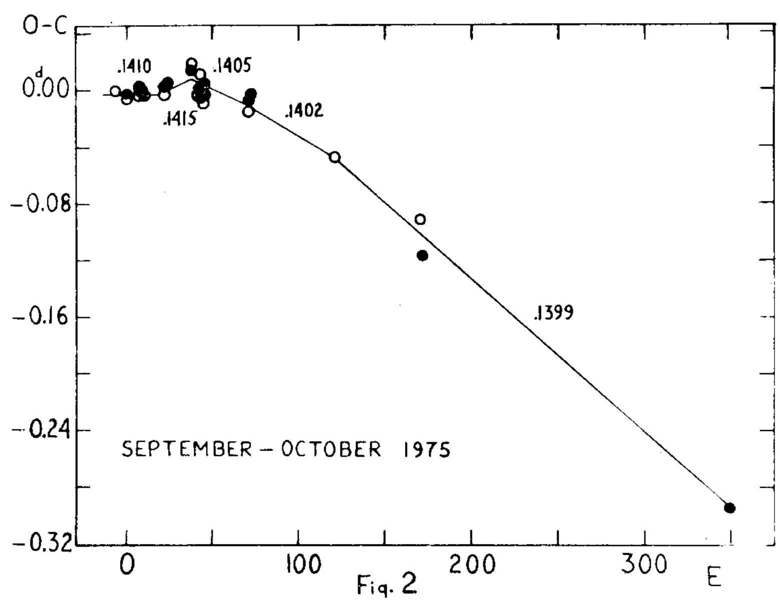
O-C
0.00
-0.08
-0.16
-0.24
-0.32
.1410
.1405
.1415
.1402
.1399
SEPTEMBER – OCTOBER 1975
0
100
200
300
E

Fig. 2

In September 1975 the period of the short term variations was equal to $0\overset{d}{.}1410$ (Semeniuk 1975, Rosino and Tempesti 1976). Our observations from May to July 1976 fit well into the period $0\overset{d}{.}1384$. Fig. 1 shows the O-C residuals obtained with the elements:

$$JD_{\odot}Min = 2442919.515 + 0.1384 \cdot E$$
$$JD_{\odot}Max = 2442919.588 + 0.1384 \cdot E$$

Filled dots in Fig. 1 (and also in Fig. 2, following below) correspond to minima, open circles correspond to maxima. We can see that the O-C residuals do not exceed $0\overset{d}{.}02$ and no other period can give such a good agreement. Slightly different values of period could be accepted if the variations of amplitude were sufficiently large to interchange the roles of maximum and minimum, but in any case the period cannot be larger than $0\overset{d}{.}1390$ and this value is much smaller than the value $0\overset{d}{.}1410$ observed in September 1975. Then, we have a strong evidence for a large change of period that occurred during 9 months. Fig. 1 shows that the decrease of period may continue also in June 1976.

As the observations made in December 1975, considered separately, fit into the period $0\overset{d}{.}1396$ we can conclude that the new observations taken together indicate a continuous decrease of period from September 1975 to July 1976. Taking into account this conclusion we have made the O-C diagram for the earliest series of observations from September and October 1975 (Koch and Ambruster 1975a,b; Rosino and Tempesti 1976, Tempesti 1976, Semeniuk 1975). It is shown in Fig. 2, where the O-C residuals were calculated with the elements:

$$JD_{\odot}Min = 2442664.305 + 0.1410\ E$$
$$JD_{\odot}Max = 2442664.364 + 0.1410\ E$$

Segments of straight line in Figures 1 and 2 represent approximately the changes of period and numerals written beside the different segments denote corresponding values of period. We can see that apart from the decrease of period from the middle of September on there is a marginal indication for an increase of period during a few first days of observations.

Our general conslusion is that there is a good observational evidence for a gradual decrease of period from $0\overset{d}{.}1415$ on

Sept. 12, 1975 to $0^{d}.1382$ at the end of June 1976. The observed decrease of period by 2.3 % may be interpreted in several ways as a result of mass motion of detached matter in a close binary system if we accept that the observed period reflects the true orbital period. However, it is also possible that we observe phenomena observed already in VW Hyi. During the supermaximum of this dwarf nova an apparent period was larger by 3 % than the constant orbital period, and this apparent period was also showing some decrease in course of the outburst (Marino and Walker 1974, Vogt 1974, Warner 1975).

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References:

Koch, R.H. and Ambruster, C.W. 1975a IAU Circ. 2837,
1975b ibid., 2839.

Marino, B.F. and Walker, W.S.G. 1974 Inf.Bull.Var.Stars, No 864.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

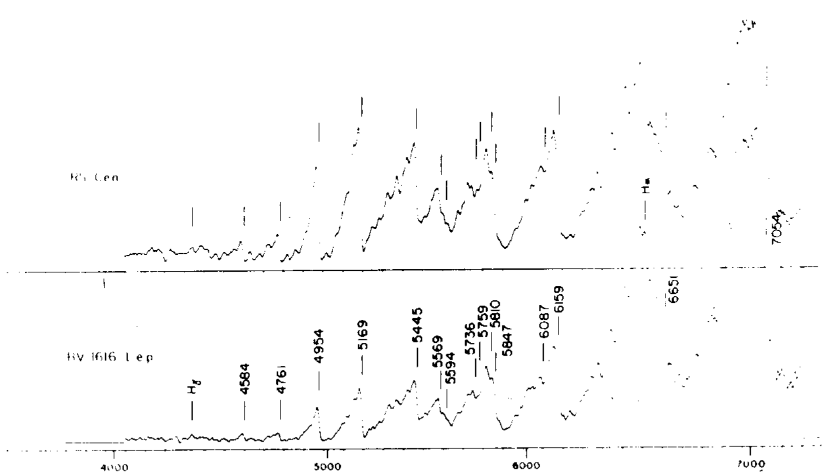
Number 1158

Konkoly Observatory
Budapest
1976 July 27

BV 1616 Lep - A PROBABLE MIRA VARIABLE

The variability of BV 1616 Lep = CSV 717 = Ross 354 has been discussed by Markworth (1), Locher (2) and summarised by Bateson (3). The star varies by about 4 mag on a timescale of a few hundred days and was suspected of being a long period eclipsing or eruptive variable.

A spectrum of BV 1616 Lep was obtained on May 19.38 (UT) (JD 2442917.88) at the Anglo-Australian 3.9m Telescope using the Wampler Robinson Image-Dissector Scanner. The spectrum is shown together with that of RS Cen, a Mira variable, obtained on the same night. The wavelength scale is somewhat non-linear and the intensity scale has not been absolutely calibrated and includes detector response. Several features due to TiO and VO absorption and Hγ and Hα emission are identified. The spectral type of BV 1616 Lep based on the calibration of Keenan (4) is M5e, with an uncertainty of two subclasses. The luminosity class could not be determined. The spectrum is clearly not that of a dwarf nova, or eruptive variable.



The effective integrated magnitude of BV 1616 Lep at the epoch of observation was 15.2 ± 0.6 mag and it was 2.0 ± 0.3 mag fainter than RS Cen.

A spectrum of the star 18 arcsec west of BV 1616 Lep was also obtained since it too was a suspected variable (2). It is of solar spectral type or later with no special peculiarities, and about 0.5 ± 0.2 mag fainter than BV 1616 Lep but not nearly as red.

Considering its probable long period variability, its spectral similarity to RS Cen and its Hα emission, it is very probable that BV 1616 Lep is a Mira variable. Whether it eclipses or not is another matter. A determination of the period and amplitude of the light curve would be useful.

We acknowledge help from D.A. Allen, F.M. Bateson, A.J. Longmore, K. Locher and S.K. Mayo.

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References:

1. Markworth, N.L. 1974, I.B.V.S. No. 921.
2. Locher, K. 1975 and 1976, B.B.S.A.G. Bulletins 19, 20, 21 and 25.
3. Bateson, F.M. 1976, Circ. M76/3 V.S.S., R.A.S.N.Z.
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1159

Konkoly Observatory
Budapest
1976 July 27

MAGNITUDES AND ELEMENTS OF VARIABLE STARS IN THE REMOTE GLOBULAR CLUSTER NGC 2419

Mean B magnitudes and elements of 41 variable stars in the remote globular cluster NGC 2419 have been derived by examining 109 plates (103a-O + GG13) obtained at Asiago, at the cassegrain focus of the Copernicus 182 cm telescope of Mount Ekar from 1973 to 1976. Comparison sequences were selected among the program stars of Racine and Harris (1975). The observations of the variables made by Baade (1935) on forty Mt. Wilson plates were also discussed, after reduction of the magnitudes to the present system. Five new variables have been discovered in the course of this research.

The results are summarized in Table 1 and Notes. The cluster contains 36 RR Lyrae variables, one 1-day cepheid and four semiregular or irregular red stars. The frequency distribution of the periods of the RR Lyr variables indicates that the cluster belongs to Oosterhoff's class II, with a concentration of the periods around $0^{d}.654$ for 25 RR-a and $0^{d}.384$ for 7 RR-c. The mean median magnitude of 36 RR Lyrae variables is 20.49 $\pm$ 0.11. Assuming for the corresponding median absolute magnitude the value M_B=+0.8, the uncorrected distance modulus is 19.7 and the distance of the same order (87 kpc) than found by Racine and Harris.

Further details and light curves will be given in a forthcoming publication.

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References:

1. Baade, W. 1935, Ap.J. 82, 396.
2. Racine, R., Harris, W.E. 1975, Ap.J. 196, 413.

Table 1

Magnitudes and elements of variable stars in NGC 2419

No	x	y	max	min	med	To	P	Notes
						244		
1	+ 40"	- 52"	18.40	19.20	18.80	----	----	1
2	- 4	- 19	19.80	21.10	20.45	2076.50	0.6692	2
3	+ 52	- 24	19.95	21.15	20.55	2043.50	0.625967	
4	+ 80	- 15	20.25	21.10	20.68	1986.53	0.39257	3
5	+ 33	+ 47	19.91	20.95	20.43	2345.63	0.655880	
6	+ 56	-127	20.25	20.95	20.60	2035.55	0.371667	
7	+ 91	+ 87	19.96	21.09	20.53	2076.62	0.627331	
8	- 17	+ 41	18.30	19.10	18.70	----	----	4
9	- 32	+ 88	19.86	20.95	20.41	2361.61	0.644733	
10	+ 20	- 51	18.19	18.94	18.57	2515.50	81.30	5
11	+ 95	- 8	19.84	20.93	20.39	2128.44	0.589322	
12	+133	+111	19.90	21.16	20.53	2076.62	0.661814	
13	+101	- 10	19.93	21.06	20.50	2361.61	0.640258	
14	-115	- 13	19.83	21.06	20.45	2345.60	0.741371	
15	+ 62	+ 40	19.91	21.04	20.48	2076.50	0.640006	
16	+ 47	+ 72	19.92	21.09	20.51	2045.46	0.666084	
17	+109	+111	19.81	21.18	20.50	2396.59	0.649033	
18	- 15	+114	18.66	19.65	19.16	2402.52	1.578524	6
19	-107	- 40	19.93	21.01	20.47	1986.52	0.702620	
20	- 28	+ 45	18.20	19.20	18.70	----	----	7
21	- 55	+ 30	19.98	21.00	20.49	2128.44	0.686094	
22	+109	- 5	19.85	21.15	20.50	2119.37	0.576645	
23	+ 27	+ 79	19.69	20.73	20.21	2121.30	0.62648:	8
24	-147	- 10	19.92	21.00	20.46	2451.32	0.652697	
25	- 59	+ 38	19.95	21.01	20.48	2424.42	0.636328	
26	- 70	- 30	19.56	20.69	20.13	2361.58	0.664924	9
27	+ 19	-103	20.34	20.79	20.57	2345.67	0.34896	10
28	-192	+ 59	19.91	20.90	20.41	2402.63	0.646539	
29	- 58	- 7	20.23	21.00	20.62	2045.46	0.725543	11
30	- 26	+ 23	20.00	21.10	20.55	----	----	12
31	+154	-146	20.27	20.93	20.60	2035.53	0.38753	
32	- 19	+ 48	19.93	20.96	20.45	2416.43	0.642240	
33	+ 47	- 17	20.30	20.94	20.62	1985.65	0.377620	
34	+ 21	+157	20.33	20.95	20.64	2071.43	0.403485	
35	+ 43	+ 8	20.15	21.06	20.61	2121.35	0.677178	
36	+ 23	+ 44	20.04	21.13	20.59	2121.41	0.648311	
37	+ 21	+ 12	19.95	21.05	20.50	2424.43	0.661044	
38	- 1	- 65	19.90	20.90	20.40	----	----	13
39	+ 28	-128	20.23	20.88	20.56	1989.60	0.40703	
40	+ 58	- 9	19.90	21.10	20.50	----	----	14
41	- 5	+ 21	20.00	20.90	20.45	----	----	14

Notes to Table 1

1. Red irregular variable. Mean B-V color index: +1.8.

2. The variable is situated within the central part of the cluster, in a crowded area. Estimates of the magnitude are difficult and this explains the large dispersion of the points in the light curve.

3. RR-c. Baade's observations are not represented in the light curve.

4. Red irregular variable. Mean B-V color index: +1.7.

5. Red semiregular variable. Mean B-V color index: +1.6.

6. This star belongs to the group of cepheids with period between 1 and 3 days which are well represented in globular clusters. Mean B-V color index: +0.35.

7. Red irregular variable. Mean B-V color index: +1.7.

8. The variable is the south-east component of a double star. Only on some of the best plates the two stars are separated. The presence of the companion strongly influences the estimates of magnitude, which appears brighter than in the other RR Lyr variables of the cluster.

9. The variable is close to a star of about 20.5 which influences the estimates.

10. RR-c. The period is somewhat uncertain and does not represent the Baade's observations.

11. The Baade's observations fit in the light curve, but are somewhat scattered.

12. In the most part of the plates the variable is blended with the images of nearby stars so that reliable estimates are not possible. Very likely RR-a, but the elements have not been found.

13. The variable is deeply inside the cluster. Very likely RR-a but the period has not been found.

14. The variable is in the central crowded area of the cluster and only a small number of estimates are available. The elements have not been found.

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1160

Konkoly Observatory
Budapest
1976 July 28

A NEW FLARE STAR IN PISCES

While carrying out an objective-prism survey with the Curtis Schmidt telescope at Cerro Tololo Inter-American Observatory, the author discovered a new, large-amplitude flare star. The discovery plate was taken on 1976 June 7. The star abruptly appeared at about m_{pg} = 8.5 at 9:59 UT, and was still well above the plate limit of about m_{pg} = 10.5 when the exposure ended 14 minutes later. (Accurate timing is possible because the objective-prism spectra are widened with a single trail.) During the flare the object showed a continuous spectrum with the Balmer lines and possibly Ca II K in emission.

The star was found at minimum on the Palomar Sky Survey prints at about 15.0 mag, at 1950 position $23^h29^m09^s$, -3°01!7. The figure gives a finding chart for the star, reproduced from the Palomar red print.

This new flare star is not only one of the apparently brightest known during outburst, but is also, with a range of more than 6 magnitudes, one of the largest-amplitude flare stars. It deserves further study by optical and radio observers.

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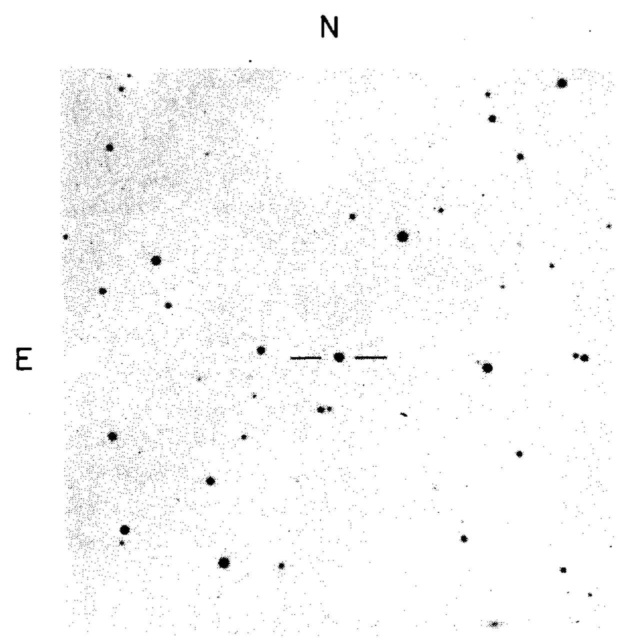

Finding chart for the new flare star. The field is a 12' square, reproduced from the Palomar Sky Survey red print. (Copyright by National Geographic Society-Palomar Sky Survey; reproduced by permission.)

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1161

Konkoly Observatory
Budapest
1976 August 2

THE DWARF NOVA WX HYDRI

WX Hyi has supermaxima with a mean visual magnitude of 11.41 and normal maxima, which are sharp and steep, having a mean visual maximum magnitude of 12.5. The mean interval between maxima,of all types, is 13.7 days. Successive supermaxima occur at mean intervals of 195.4 days but have a wide spread from 144.1 to 284.6 days.

This variables appears to be a member of the SU UMa subgroup of U Gem variables, and its variations strongly resemble those of the type star, SU UMa.Seventy-seven maxima have been observed in the interval JD 2,441,066 to 2,442,743. The observations and light curve appear in Publications No.4 (C76) of the Variable Star Section, Royal Astronomical Society of New Zealand (In Press).

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1162

Konkoly Observatory
Budapest
1976 August 3

UBV PHOTOELECTRIC MINIMA OF SV CENTAURI

SV Centauri is a Beta-Lyrae type eclipsing binary known by large period changes. A few UBV photoelectric observations including one primary and one secondary minimum made by the author and B.J. Harris at Perth Observatory in 1974 and 1975 are presented in this paper. The 60cm Lowel-Perth reflector at Perth Observatory and the integrating photometer, described by Millis *et al.* (1974), were used for measurements. The photometer contains standard UBV filters and EMI 6526S photomultiplier. Each observation consisted of at least three 10 sec integrations in each colour. The variable star and its comparison were observed in the usual sequence CVCVC etc. The star HD 102503 which is of nearly the same colour and only at an angular distance of 5 min of arc from SV Cen served as comparison star. The brightness of the sky background was read after the measurement with each filter.

The reduced data in Table I represents time in heliocentric Julian Days and observed differential magnitudes (in telescope-photometer natural system) in the sense variable star minus comparison star, linearly interpolated for the time of the measurement of the variable. The reduction of measured values was performed with the Hewlett-Packard 1900 desk calculator (with extended memory HP 9101A) and both the measured values and the reduced data were plotted simultaneously on the HP 9125B calculator plotter in the way described in a previous paper (Kvíz, 1975).

The time of minima was computed according to Kwee and van Woerden's (1956) method. The errors given in Table 2 may be spurious, as owing to various circumstances the accuracy of the time of individual measurements in 1974 was hardly better than .001 day. The observations in February 1974 were made by Mr. B.J. Harris, government astronomer, the rest by the author.

I wish to express my appreciation to the staff of Perth Observatory for their help during my stay there. For assistance during observations in 1975 I thank Mrs. I.W. Nikoloff from Perth Observatory.

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References:

Kvíz, Z. 1975, Proc. Astr. Soc. Australia 2, 351.
Kwee, K.K. and van Woerden, H. 1956, Bull. Astr. Inst. Neth. 12, 327.
Millis, R.L. *et al*. 1974, Icarus 23, 425.

Table I

UBV Photoelectric Measurements of SV Centauri

$JD_{\odot}$ 2440000.+	ΔV		ΔB		ΔU
2068.1484	+1.172	2068.1498	+1.195	2068.1519	+1.098
1651	+1.250	1665	+1.229	1679	+1.130
1831	+1.328	1852	+1.305	1866	+1.217
2033	+1.383	2047	+1.391	2060	+1.271
2262	+1.482	2283	+1.486	2297	+1.368
2387	+1.499	2408	+1.509	2429	+1.385
2547	+1.505	2560	+1.485	2581	+1.399
2679	+1.477	2692	+1.454	2706	+1.365
2845	+1.415	2859	+1.406	2873	+1.317
3012	+1.355	3033	+1.334	3047	+1.244
3158	+1.302	3179	+1.273	3199	+1.187
3310	+1.263	3331	+1.246	3345	+1.149
3435	+1.218	3449	+1.205	3463	+1.110
2069.1346	+1.655	2069.1367	+1.681	2069.1380	+1.704
1394	+1.639	1415	+1.649	1429	+1.685
1450	+1.612	1464	+1.612	1485	+1.622
1561	+1.544	1575	+1.552	1589	+1.561
1700	+1.448	1721	+1.441	1735	+1.463
2089	+1.269	2103	+1.271	2117	+1.244
2097.2084	+1.718	2097.2112	+1.720	2097.2133	+1.714
2230	+1.765	2251	+1.831	2265	+1.882
2404	+1.898	2424	+1.930	2445	+1.978
2549	+1.975	2570	+2.046	2591	+2.145
2695	+2.071	2716	+2.110	2737	+2.225

2097.2695	+2.071	2097.2716	+2.110	2097.2737	+2.225
2772	+2.101	2792	+2.108	2813	+2.230
2924	+2.008	2945	+2.004	2966	+2.137
3161	+1.873	3174	+1.835	3195	+1.888
3376	+1.677	3397	+1.677	3417	+1.720
2427.1825	+1.123	2427.1843	+1.113	2427.1849	+1.045
1913	+1.146	1926	+1.164	1940	+1.196
2007	+1.176	2020	+1.178	2036	+1.118
2109	+1.224	2125	+1.215	2136	+1.235
2199	+1.256	2210	+1.247	2427	+1.232
2287	+1.289	2298	+1.276	2310	+1.305
2374	+1.312	2387	+1.301	2398	+1.280
2455	+1.356	2467	+1.347	2479	+1.310
2540	+1.381	2552	+1.380	2564	+1.423
2618	+1.418	2633	+1.419	2659	+1.534
2727	+1.468	2740	+1.483	2751	+1.566
2826	+1.525	2837	+1.549	2848	+1.577
2909	+1.585	2921	+1.605	2932	+1.559
2992	+1.632	3004	+1.647	3016	+1.667
3078	+1.677	3091	+1.719	3101	+1.794
3157	+1.750	3169	+1.775	3179	+1.791
3241	+1.817	3254	+1.840	3265	+1.987
3326	+1.892	3338	+1.909	3349	+2.044

Table II

Time of minimum

	T min	σ
Primary	2097.2754	± .0006
Secondary	2068.2482	± .0005

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1163

Konkoly Observatory
Budapest
1976 August 3

PHOTOELECTRIC MINIMA OF ECLIPSING BINARIES

The following Table gives photoelectric minima obtained during the year 1975 at the Ege University Observatory, Izmir (Turkey) and the Nürnberg Observatory (Germany). Minima of eclipsing binaries observed at both observatories 1960-1974 were published in Astr.Nachr. 288, 69 (1964); 289, 191 (1966); 291, 111 (1968); IBVS 456 (1970), 530 (1971), 647 (1972), 937 (1974) and 1053 (1975).

The Table gives the heliocentric minima three different O-C's, the type of filter (UBV), the abbreviations of the names of the observers and the type of the instruments used (Izmir: 48 cm Cassegrain, or 15 cm refractor, Nürnberg: 34 cm Cassegrain, all with phototube 1P21).

Abbreviations of the observers' names:

Ad = A. Durgut
Ar = G. Arneth
Be = G. Besold
Bo = G. Bode
Eb = J. Ebersberger
Er = A.Y. Ertan
Gd = N. Güdür
Gl = Ö. Gülmen
Gn = G. Isik
Gr = R. Gröbel
He = W. Hetterich
Ib = C. Ibanoglu
Ki = A. Kizilirmak
Nc = N. Damla
Nr = N. Celikezer
Od = O. Demircan
Rd = E. Roderer
Sb = R. Sendelbeck
Sc = H. Schellemann
Si = B. Schieweck
Sr = C. Sezer
Tn = Z. Tunca
We = Th. Weber

Remarks:

O-C (I) : GCVS, Moscow 1969/70 or First or Second Supplement to the Third Edition of the GCVS. Moscow 1971 and 1974.
O-C (II): SAC 47, Krakow 1975
O-C(III): i Boo IBVS 209 (1967) Pohl
RZ Cas Scientific Reports of the Faculty of Science, Ege University No. 120, Astronomy No.12 (1971), A.Kizilirmak
AG Per : The elements with third term (First Supplement to the third edition of GCVS, Moscow 1971) give O-C of about $-0\overset{d}{.}035$ for Min. I, about $-0\overset{d}{.}050$ for Min.II.

The(O-C)'s for secondary minima (Min II) were calculated on the supposition that they are symmetric between primary minima (if not special data are given).

m : only the elements I or the elements II give secondary minimum.
The sign=between O-C(I) and O-C(II) indicates, that the elements (I) and (II) are equal.
The sign : means that the time of minimum (last decimal) is uncertain.

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F.R.G.

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Star	Min.hel.	O-C (I)	O-C (II)	O-C(III)	Filt.	Obs.	Instr. cm	Rem
	2442							
RT And	717.3586	+0.0001	-0.0122			Gr/He	34	
OO Aql	301.3758	+0.0001(m)	+0.0092		B,V	Gd/Od	48	
	311.2580	-0.0001	+0.0090(m)		B,V	Gd/Od	"	
i Boo	449.501	+0.020	+0.008	+0.018	V	Eb	34	
	465.4365:	+0.0209:	+0.0087:	+0.0182:	V	Gr	"	MinII
	465.567 :	+0.017 :	+0.005 :	+0.015 :	V	Gr/Rd	"	
	581.397	+0.018	+0.006	+0.015		Gd/Ki	15	MinII
	600.4137:	+0.0198:	+0.0081:	+0.0170:	V	Eb	34	MinII
SV Cam	517.5142	-0.0094	-0.0051		B,V	Er/Gl/Nr	48	
	545.3909	-0.0071	-0.0028		B	Gl/Nr/Tn	"	
	545.3895	-0.0085	-0.0042		V	Gl/Nr/Tn	"	
	771.350	-0.008	-0.004		B,V	Gl/Nr	"	
	777.2786	-0.0105	-0.0058		B	Gl/Nr	"	
	777.2792	-0.0099	-0.0052		V	Gl/Nr	"	
RZ Cas	454.4755:	+0.0036:	-0.0049:	+0.0064:		Ar/We	34	
TV Cas	590.4729	-0.0149	-0.0073			Bo/Eb	"	
	659.3506	-0.0164	-0.0088		B	Ad/Gd/Nc	48	
	659.3513	-0.0157	-0.0081		V	Ad/Gd/Nc	"	
U Cep	452.417	+0.030	+0.003			Ar/Rd	34	
VW Cep	434.3686	+0.0080 =	+0.0080			Gd/Ki	15	
	449.4002	+0.0106 =	+0.0106		B	Sr	"	
	449.3967	+0.0071 =	+0.0071		V	Sr	"	
	530.388 :	+0.009 : =	+0.009 :			Eb/Rd/Sc	34	
	556.405	+0.004 =	+0.004		B	Ib/Sr	15	MinII
	556.409	+0.008 =	+0.008		V	Ib/Sr	"	MinII
	556.550	+0.009 =	+0.009		B	Ib/Sr	"	
	556.546	+0.005 =	+0.005		V	Ib/Sr	"	
	562.397	+0.012 =	+0.012		B,V	Sr	"	
	606.513 :	+0.015 : =	+0.015 :			Ar/Eb	34	
477 Cyg	628.5150	+0.0057 =	+0.0057			Eb/He	"	
548 Cyg	575.443	+0.005	-0.016			Eb/Gr	"	

Star	Min.hel.	O-C (I)	O-C (II)	O-C (III)	Filt.	Obs.	Instr. cm	Rem
	2442							
548 Cyg	631.4055	+0.0053	-0.0169		B	Er/Gn/Sr	48	
	631.4052	+0.0050	-C.0172		V	Er/Gn/Sr	"	
	640.4317	+0.0053	-0.0170		B	Er	"	
	640.4324	+0.0060	-0.0163		V	Er	"	
	667.5126	+0.0075	-0.0150		B	Er/Gn/Nc	"	
	667.5122	+0.0071	-0.0154		V	Er/Gn/Nc	"	
RX Her	583.4931	+0.0007	+0.0003			Bo	34	MinII
TX Her	561.540	+0.037	+0.046			Be/Eb	"	MinII
AK Her	532.5291	+0.0001 =	+0.0001			Eb/Sb	"	
SW Lac	630.3750	-0.0177 =	-0.0177		B,V	Gd	48	
	697.4039	-0.0192 =	-0.0192			Eb/Si	34	
UV Leo	453.4937	-0.0055	+0.0077			Be	34	
	508.419 :	+0.012 :	+0.025 :			Be/Rd	"	MinII
AM Leo	493.392	+0.002	-0.004			Eb/Rd	"	
	521.375	+0.001	-0.004			Gr/Rd	"	MinII
RR Lyn	472.3982:	+0.0018:	-0.0034:			Eb/Rd/We	"	
502 Oph	570.4558:	+0.0069:=	+0.0069:			Eb/Gr/Rd	"	MinII
FT Ori	451.3304	+0.0166 =	+0.0166			Eb/Gr	"	
AT Peg	712.2435:	+0.0338:	-0.0118:			Eb	"	
AG Per	377.3459		-0.0121			Gd	15	
	384.4722		+0.0136		B,V	Gd/Tn	48	MinII
	386.504 :		+0.017 :		B	Gd/Sr	"	MinII
	386.500 :		+0.013 :		V	Gd/Sr	"	MinII
	668.4971		+0.0164		B,V	Gd	"	MinII
	727.3307		+0.0169		B,V	Gd	"	MinII
	728.3113		-0.0169		B,V	Ad/Gd/Gn	"	
DM Per	711.5013	+0.0476	+0.0027			Be/He/Si	34	
IZ Per	630.4953	+0.0155 =	+0.0155			Eb/He/Sc	"	

Star	Min.hel.	O-C (I)	O-C (II)	O-C (III)	Filt.	Obs.	Instr. cm	Rem
	2442							
β Per	725.4604:	+0.0022:	-0.0048:		V	Eb/He/Sc	34	
471 Tau	720.334 :	-0.002 :			B	Er/Ib	48	
	723.464 :	+0.001 :			B	Er/Ib	"	
W UMa	450.3821	-0.0068	-0.0062			Be/Bo	34	
AG Vir	451.480	+0.006	-0.006			Eb/Gr	"	MinII
AH Vir	501.408	+0.032	+0.031			Eb/Rd	"	MinII

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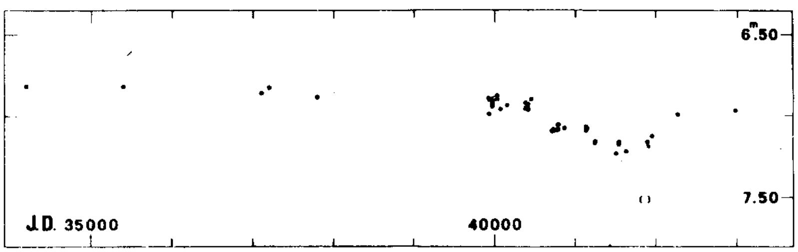
LIGHT VARIATIONS OF THE JOHNSON'S STANDARD STAR BD $+3^{\circ}4065$

The Be star BD $+3^{\circ}4065$ has been observed repeatedly from 1968 to 1976 with the 40 cm refractor of the Teramo Observatory in the course of a routine program of observation of standard stars as a part of a general photometric program. The star, which is listed in the Johnson's catalogue (Johnson and Harris, 1954) with the V magnitude 6.82, appeared during the last 8 years to fade slowly from 6.9 to 7.2 and then to recover its primary brightness (the result of an observation yielding the magnitude 7.51 is to be considered doubtful being based on a single measure).

The magnitude given in the Johnson's catalogue may be roughly located at the epoch 1952 $\pm$ 1 year; other magnitude determinations have been picked out from the literature (Mendoza, 1958; Cousins and Stoy, 1963; Johnson and Borgman, 1963; Nekrasova et al., 1965). All these magnitudes are listed in the Table together with the determinations performed at Teramo; the mean accuracy of the Teramo magnitudes is $\pm$ 0.03. The light curve shows slow fluctuations between 6.8 and 7.2. The spectrum of the star is recorded in the catalogue of B stars with bright hydrogen lines (Merrill and Burwell, 1933) as B2se; Cousins and Stoy classified it as B0.5 IV. According to Rosino (1976) on a plate obtained at the Asiago Observatory in May 1976 with a dispersion of 60 Å/mm the spectrum belongs to the class B0 Ib with Hα in emission; all the other lines appear as sharp absorptions and no evidence of P Cygni effect has been found.

The presence of light fluctuations in some Be stars is since long known: the cases of P Cygni, θ CrB, and γ Cas which undergo brightness fluctuations of a few tenths show how difficult and deceiving is the attempt of analysing the light curve (see f.i. De Groot, 1968).

The discordance between the luminosity classification stated by Cousins and that observed by Rosino is rather puzzling. Nevertheless the s character of the spectral lines was already reported by Merrill and Burwell, moreover Mendoza states that with some certainty



Light curve of BD +3°4065 from 1952 to 1976.

Table

Photoelectric Observations of BD +3°4065

J.D. 24	V	B-V	Source	J.D. 24	V	B-V	Source
34200:	6.82	+.02	Johnson & Harris	40710	7.10	+.07	Present
35400:	6.82	.02	Mendoza	40735	7.09	.07	Comm.
37100:	6.86	.03	Cousins & Stoy	40769	7.09	.08	"
37200:	6.83	.02	Nekrasova et al.	40774	7.06	.06	"
37800:	6.89	.03	Johnson & Morgan	40782	7.06	.05	"
39928	6.89	.01	Present Comm.	40794	7.09	.05	"
39940	6.90	.03	"	40866	7.08	.07	"
39941	7.00	.10	"	41134	7.09	.09	"
39968	6.91	.07	"	41144	7.07	.08	"
39970	6.93	.04	"	41151	7.08	-	"
39972	6.95	.05	"	41244	7.17	.07	"
39973	6.91	.02	"	41250	7.17	.05	"
39985	6.90	.02	"	41502	7.23	.10	"
40029	6.88	.02	"	41536	7.17	.04	"
40035	6.90	.04	"	41544	7.16	.06	"
40066	6.96	.03	"	41628	7.22	.10	"
40151	6.94	.03	"	41863	7.51	.06	"
40388	6.96	.07	"	41893	7.16	.06	"
40389	6.92	.07	"	41902	7.19	.06	"
40416	6.97	.06	"	41955	7.13	.04	"
40418	6.96	.06	"	42276	6.99	.06	"
40420	6.93	.06	"	42988	6.97	-	"
40454	6.90	.04	"				

The dates marked with a colon are uncertain within a few hundreds of days.

the luminosity classes of the stars of a list including BD+3^{o}4065 lie between III and V on the MK system even though accurate luminosity classification had not been attempted.

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FAST VARIATIONS OF ε AURIGAE

The spectral variability of the F supergiant star of the ε Aurigae binary system has been known for a long time (Ludendorff (1906), Wright (1955), Hack (1958)). The change in the shapes of the lines was always observed in spectra obtained at different epochs or during different nights. We have also observed variations in spectra obtained on the same night with a time difference of about 15^m. The spectra used are listed in Table 1. They were obtained with the Coude spectrograph of the 152 cm telescope of the Haute Provence Observatory. The dispersion of all the spectra is 7.5 Å/mm and the quality of the spectrograms is very good.

The equivalent width variation between GC 105 and GC 107 and between GC 117 and GC 118 is shown in Fig. 1a,b. Both in GC 107 and GC 118 the equivalent widths are stronger than in GC 105 and in GC 117,respectively. A slight variation between GC 111 and the other spectra obtained on the same night is also suspected (Fig.1c). No variations are observed between GC 105, GC 110, GC 112, GC 117, GC 119. The plots concerning these spectra are all similar to that in Fig.1d. In the red region we also observe slight variations of equivalent width during the same night for lines with remarkable line profile variations. The variability of the shape of the line profiles is more or less evident in all the spectra. Some blends are resolved in some spectra and not in others. An example is the blend of YII(22),λ 4900.13 and BaII(3),λ 4489.93. The two lines are well separated only in GC 117 (Fig.2). We have not observed radial velocity variations corresponding to line intensity variation.

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Ludendorff H., 1906, Astron. Nachrichten 171, 4
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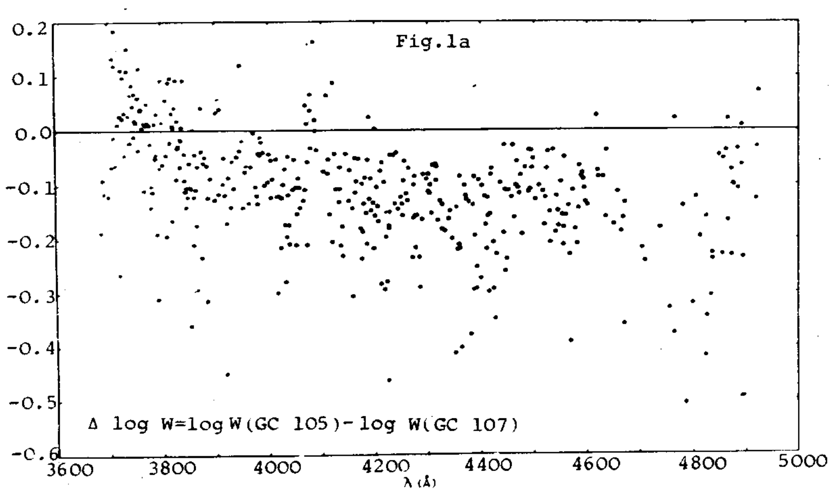
Table 1

The spectrograms

Plate No.	Date	Hour	Spectral region (Å)	
GC 105	11. 2.1971	24^h07^m	3600 -	4940
GC 107	11. 2.1971	24 23	"	"
GC 110	12. 2.1971	22 05	"	"
GC 111	12. 2.1971	22 11	"	"
GC 112	12. 2.1971	22 28	"	"
GC 117	14. 2.1971	21 09	"	"
GC 118	14. 2.1971	21 19	"	"
GC 119	14. 2.1971		"	"
GC 120	14. 2.1971	22 01	4800	6750
GC 121	14. 2.1971	23 13	"	"



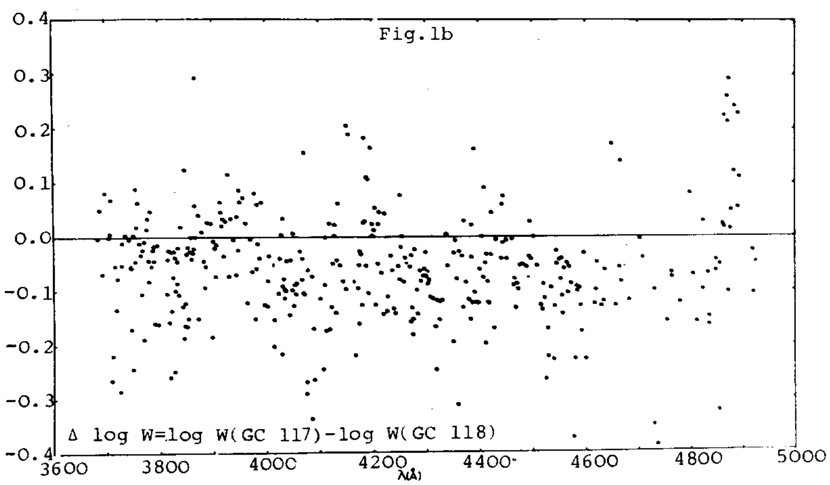


Fig.1b
Δ log W=log W(GC 117)-log W(GC 118)
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
3600
3800
4000
4200
4400
4600
4800
5000
λ(Å)

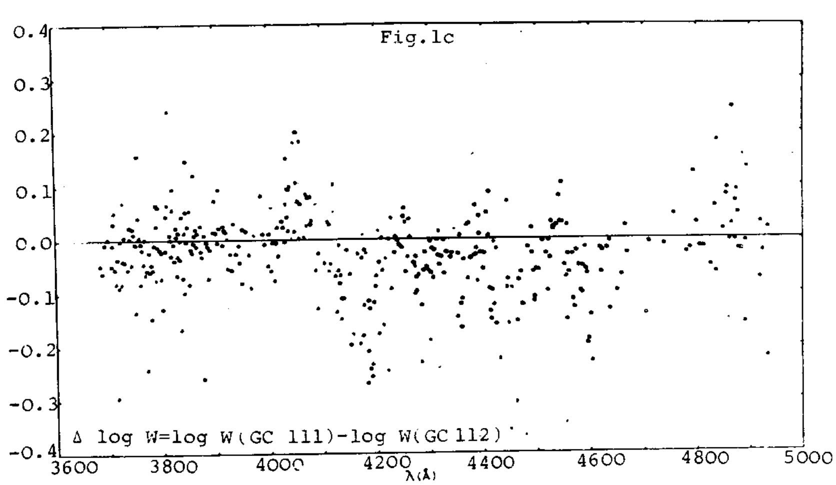


Fig.1c
Δ log W=log W(GC 111)-log W(GC 112)
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
3600
3800
4000
4200
4400
4600
4800
5000
λ(Å)

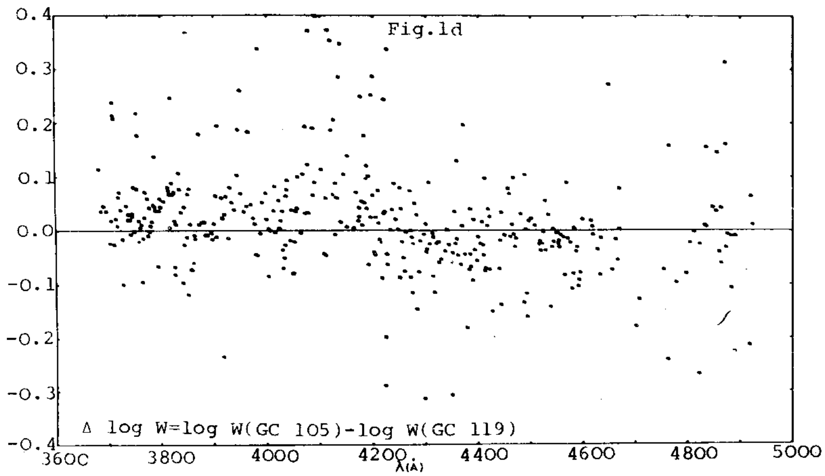
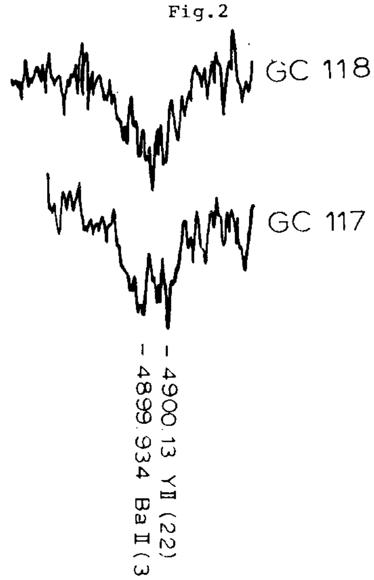


Fig.1d
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
Δ log W=log W(GC 105)-log W(GC 119)
3600
3800
4000
4200
4400
4600
4800
5000
λ(Å)

Fig.2



GC 118
GC 117
4900.13 YII (22)
4899.934 BaII (3)

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HDE 255930 - A NEWLY-DISCOVERED VARIABLE IN ORION

In the course of a photoelectric and spectroscopic study of the OB stars in northern Monoceros (Turner, 1976, Astrophys. J., in press) the star HDE 255930 (1900 coords: $6^h\ 16^m.5$, $+10°\ 57'$) was found to vary by 0.21 magnitude in V, according to observations on four different nights in November 1974 and February 1975. No changes in color were detected over this period, and a spectrogram of the object led to an MK classification of B2 IV for the star. In order to learn more about the nature of the variability, additional photoelectric observations of this star were obtained in March 1976 with the University of Toronto 61-cm telescope on Cerro Las Campanas, Chile. A catalog of UBV observations for this star follows.

JD 2442000+	V	B-V	U-B
361.798	9.708	+0.145	-0.572
362.646	9.923	+0.101	-0.524
363.650	9.716	+0.109	-0.557
460.559	9.863	+0.108	-0.600
460.631	9.841	+0.103	-0.549
836.611	9.772	+0.122	-0.596
837.597	9.739	+0.117	-0.557
838.528	9.919	+0.099	-0.557
838.530	9.919	+0.101	-0.557
839.535	9.755	+0.105	-0.566
839.536	9.760	+0.100	-0.566
839.618	9.792	+0.085	-0.566
840.533	9.753	+0.104	-0.563
840.535	9.749	+0.112	-0.560
844.546	9.939	+0.100	-0.533
844.548	9.925	+0.109	-0.542
844.591	9.926	+0.126	-0.568
844.592	9.930	+0.111	-0.555
844.618	9.908	+0.104	-0.536
844.620	9.909	+0.118	-0.536
846.550	9.693	+0.102	-0.547
846.551	9.691	+0.112	-0.558
Mean	9.824	+0.109	-0.558

On the basis of these observations, HDE 255930 appears to be an eclipsing binary system of the Beta Lyrae type. A period of about 3 days gives the best fit to the data, although a period of 6 days is also permitted. Further observations of this newly-discovered variable would clearly be of interest.

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PHOTOELECTRIC OBSERVATIONS OF HD 184905 AND HD 134793

Photoelectric observations of the magnetic variable star HD 184905 in UBV system have been performed by Burke et al. [1] in 1967-68. In terms of those observations they noticed periodic light variations and the period was even estimated (P=1.855 days). In 1970 Morrison et al. [2] observed the star photoelectrically in four colours (u,v,b,y). They also ascertained the elements of light variations. The period was estimated as P=2.17 days. On the basis of presenting all the observations with both periods these authors came to the conclusion that none of these periods can be given preference to.

In 1968 the magnetic variable HD 184905 was observed photoelectrically with the Abastumani Astrophysical Observatory 33cm reflector and in 1969 the observations were performed with the 48cm reflector (A3T-14A) in three colours (U,B,V).

Differences between the comparison stars were determined. The variation of the differences between the comparison stars drew our attention; either a change in the instrumental system or the variations of one of the comparison stars might have explained this fact. The analysis of our observational material showed no substantial change in the instrumental system. This gave rise to suspicion concerning the variations of HD 184695. Then we considered the difference in light between the variable and only the comparison star HD 184787.

We made an effort to set out our observations with both periods and then to compare them. It is clear that the observations in yellow and ultraviolet present themselves almost similarly with both periods. The observations in blue presented with P=1.855 days do not exhibit any periodic light variations while with P=2.17 days they do (though the amplitude is small $-0^m.02$). Besides, the light variation curve in blue is in phase with those constructed for other colours. In termsof the foregoing we came to the conclusion that our observations are presented better with P=2.17 days.

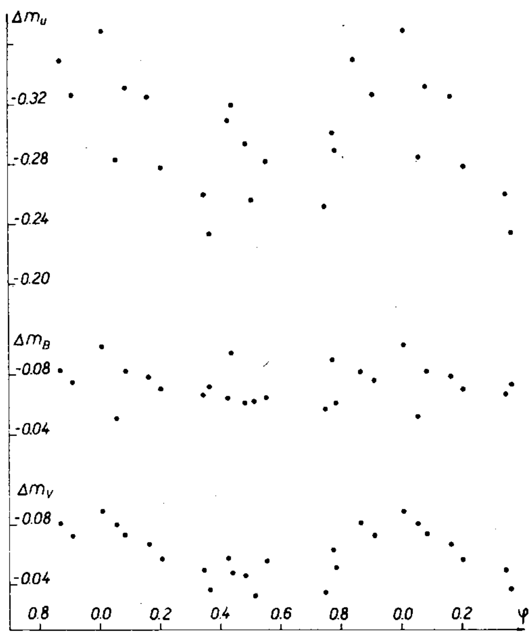

Figure shows the average curves of light variation for HD 184905 in UBV light based on p=2.17 days.

According to the photoelectric observations of Burke et al. [1] light variations more than $0^{m}.015$ were not noticed for the magnetic variable HD 134793. We have observed this variable photoelectrically in 1967-69. The observations show possible variations of light, $0^{m}.08$ and $0^{m}.05$ in ultraviolet, blue and yellow, respectively.

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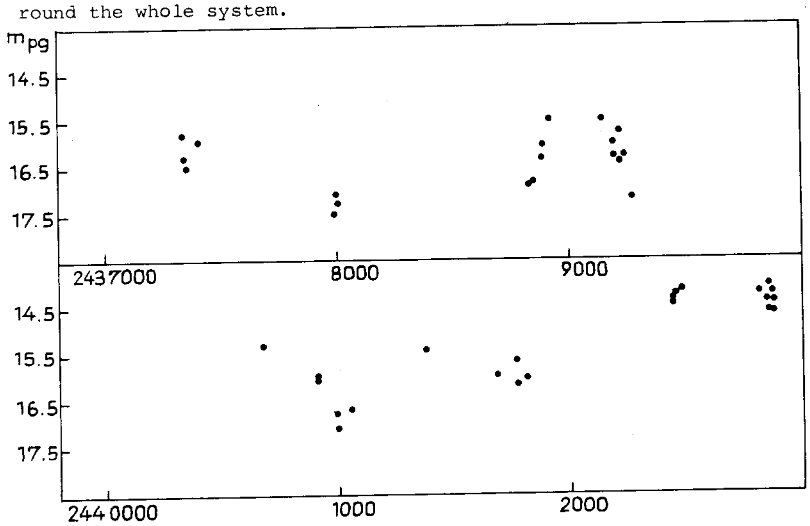
THE LONG-TIME VARIABILITY OF AN UMa

According to Shugarov (Astr.Tsirk.888,7) AN UMa is an eclipsing binary with P = 0.d1595. This result was confirmed by Mumford (IBVS 1133). Meinunger and Wenzel (VSS 7,405) found for this star a long-time variability which on all levels of brightness is superposed by fast variations.
In the meantime further plates of the field ψ UMa were taken at Sonneberg. The figure shows the long-time variations of AN UMa on our plates.
Probably these variations are caused by a mechanism like that in the R CrB-stars, i.e., a system of clouds of variable opacity around the whole system.



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OBSERVATIONS OF THE SYMBIOTIC STAR CI Cyg IN 1975

Activity of the symbiotic star CI Cyg in 1971-74 increased considerably as compared with 1900-70 years. (Belyakina, 1974; Tempesti, 1976). In 1975 this star also continued to be active. It was demonstrated by photoelectric observations carried out with 64-cm meniskus telescope of the Crimean Astrophysical Observatory, having an instrumental system close to the UBV system. The star +35°3821 (V=10^{m}.49, B-V=+0^{m}.31, U-B=+0^{m}.13) was used as comparison star.

Our observations in the instrumental system are plotted in Fig.1 (filled circles). Open circles and open triangles correspond to the visual observations of AAVSO (Mattei,1975 and J.Bortle (1975). One can see from Fig.1 that the amplitude of CI Cyg in yellow light exceeds 2^{m}.5, but those of the blue and ultraviolet lights exceed 3^{m}.0.

In Fig. 2 our observations of 1973-75 carried out in blue light are compared with two photographic composite light curves of CI Cyg having a 855^{d} period. Open triangles, open circles and the solid line correspond to our observations in 1966, 1973-74 and 1975 (Belyakina 1966, 1974). Filled circles and crosses show two photographic composite light curves according to the estimates of N.K. Greenstein (1937) and D. Hoffleit (1968)(Pucinskas, 1972).

It follows from Fig.2 that the deep minimum of 1975 coincides with that of the composite light curves, being more narrow than the last. It can be supposed this minimum is a display of an eclipse in the binary system.

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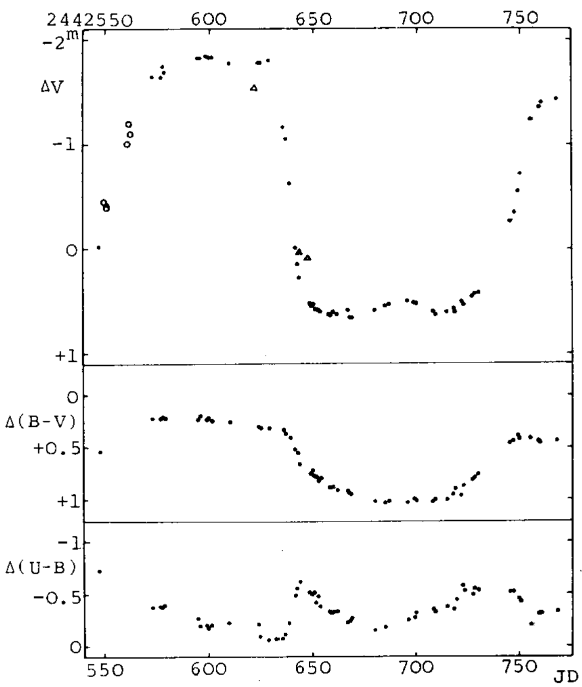
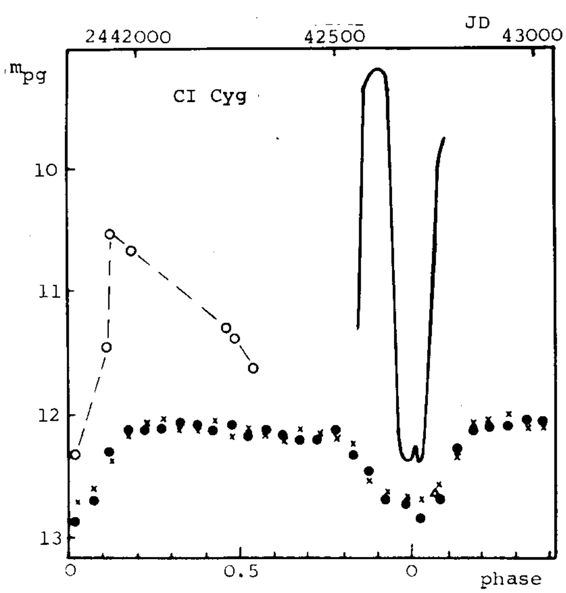

2442550
600
650
700
750
-2m
ΔV
-1
0
+1
0
Δ(B-V)
+0.5
+1
-1
Δ(U-B)
-0.5
0
550
600
650
700
750
JD


2442000
42500
JD
43000
mpg
CI Cyg
10
11
12
13
0
0.5
0
phase

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1170

Konkoly Observatory
Budapest
1976 August 19

TWO NEW SUPERNOVAE IN ANONYMOUS GALAXIES

In the course of our supernova search program (s. detailed description by L. Detre in Supernovae and Supernova Remnants, ed. C.B. Cosmovici, 1974, pp.51-53.) two new supernovae were found.

By comparing older plates with new ones of the survey program I discovered a supernova in the anonymous galaxy $\alpha=13^h18^m.0$; $\delta=+31^\circ47'$ (1950) on a plate taken by Mr. G.Szécsényi-Nagy with our 60/90/180 cm Schmidt-telescope on March 15, 1972. The identification chart is shown in Fig.1. The supernova appeared about 4" to the west of the centre of the galaxy and its brightness was about of 14 magn.

The other new supernova was found in the anonymous galaxy $\alpha=16^h44^m.0$; $\delta=+58^\circ24'$ (1950). This galaxy is very faint and its structure can only be seen on the blue Palomar survey print. The identification chart for this object and the supernova is given in Fig.2. The supernova was blown up about 7" to the west of the centre and was nearly 3 magn. brighter than the parent galaxy. Its brightness was about 17 magn. on the night of the discovery, on July 26, 1976 and did not change noticeably during the following week.

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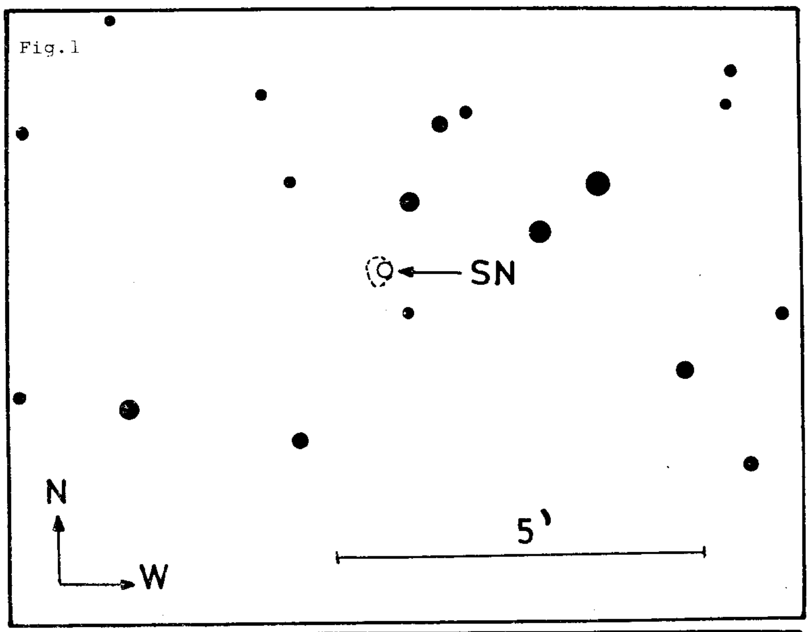
Fig.1
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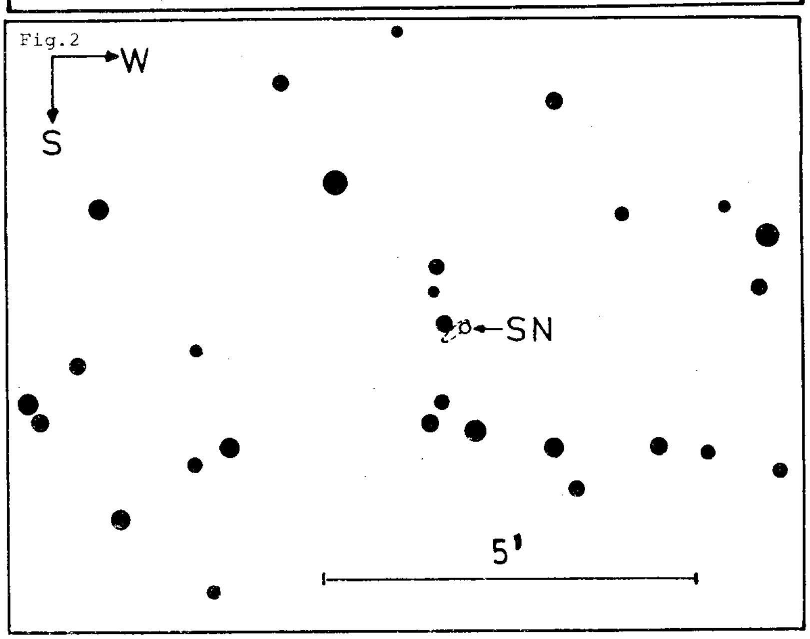
Fig.2
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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1171

Konkoly Observatory
Budapest
1976 September 3

NEW B,V LIGHT CURVES OF SZ LYNCIS

The RR_s star SZ Lyn was observed on February 29 and March 3, 1976, with the 36 cm Cassegrain telescope of the Hoher List Observatory. A single channel photometer equipped with a 1P21 multiplier and Schott BG12(1mm)+GG13(2mm) = B, GG11(2mm) = V filters, a conventional amplifier, and a strip chart recorder were used.

Following the investigations of van Genderen (1963) and Barnes and Moffett (1975), BD +45°1544 served as a comparison star. We also adopted their data V = $9^m.43$, B - V = $0^m.46$ for this star.

1. Times of Maximum Light

Two times of maximum light were determined by Pogson's method (Schiller 1923). The mean error of a maximum time is about $0^d.0006$. The O - C's, calculated from Barnes and Moffett's sinusoidal ephemeris, are

E	t_{max}(J.D.hel.)	O - C
39100	2 442 837.3091	+ $0^d.0006$
39133	2 442 841.2875	+ 0.0012

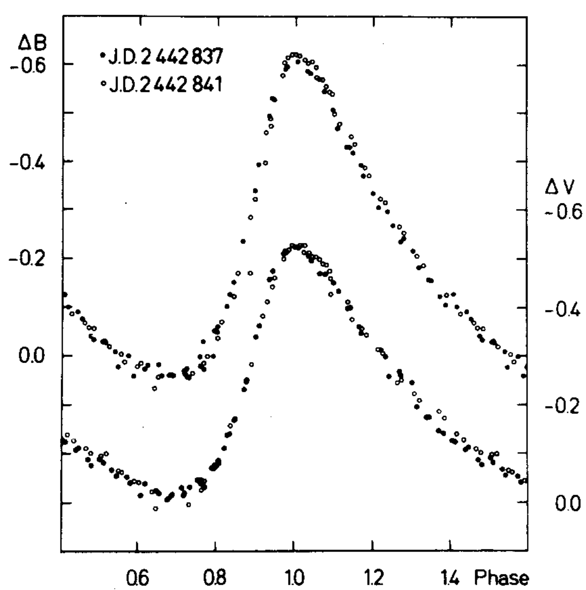

Fig. 1. B, V light curves of SZ Lyn, relative to BD +45°1544

2. Light Curves

Fig. 1 is composed of 121 B and 122 V observations which are listed in Table 1. Observations of J.D. 2 442 837 are shown as dots, those of J.D. 2 442 841 as circles. The light curves do not coincide. Deviations are particularly noticeable in the phase interval 0.0 to 0.6. In the second night, the star appeared bluer during maximum and became redder during later phases.

3. Maximum Light

Barnes and Moffett investigated the B magnitude at maximum light of SZ Lyn versus phase in the 1148 day cycle of the period variations and found no correlation. Nevertheless, their own observations indicated an increase in the brightness of SZ Lyn, compared with earlier investigations. This trend seems to continue in our new observations (Fig. 2). Also, the B magnitude at minimum light and the V magnitudes exhibit a similar phenomenon. In order to discriminate the possible secular increase in brightness of SZ Lyn against a decrease of the brightness of BD +45°1544 and/or difficulties with the transformations of the colour systems of various observers, careful observations during the next seasons are necessary.

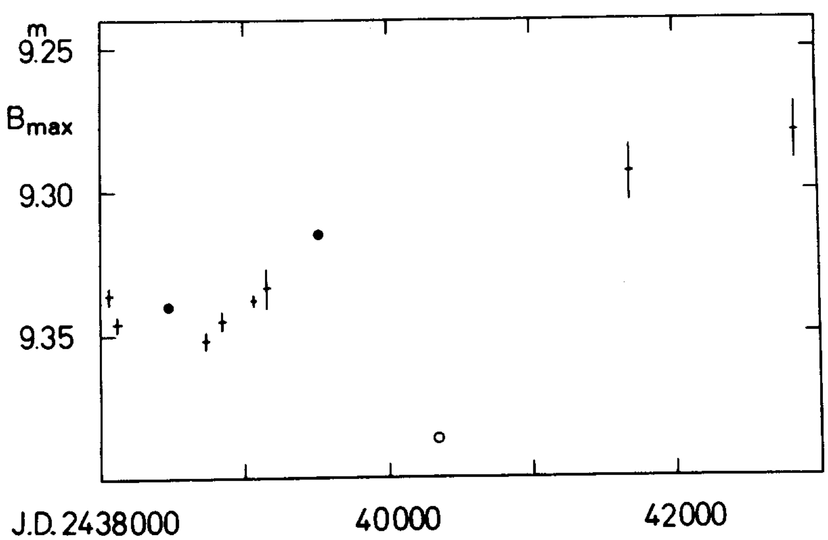

Fig. 2. Secular variation of the B magnitude at maximum. Data are taken from the compilation of Barnes and Moffett (1975), the two dots are derived by the author from the observations of Joshi and Srivastava (1967); the circle represents the result of a single observing run by Wisse and Wisse (1969)

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Table 1. B, V magnitude differences relative to BD +45°1544

J.D.HEL. 2442...	ΔB	J.D.HEL. 2442...	ΔB	J.D.HEL. 2442...	ΔV	J.D.HEL. 2442...	ΔV
837.2756	0.037	837.4099	-.128	837.2771	-.032	837.4056	-.077
.2768	.044	841.2776	-.398	.2807	-.040	.4084	-.111
.2802	.021	.2793	-.473	.2818	-.032	.4094	-.138
.2814	.027	.2830	-.578	.2848	-.071	841.2800	-.442
.2843	0.000	.2843	-.597	.2861	-.086	.2837	-.500
.2855	-.050	.2882	-.620	.2896	-.141	.2852	-.514
.2907	-.153	.2898	-.611	.2911	-.172	.2887	-.529
.2934	-.235	.2936	-.575	.2939	-.231	.2902	-.528
.2970	-.340	.2953	-.570	.2947	-.251	.2936	-.505
.2982	-.393	.2991	-.499	.2976	-.340	.2948	-.499
.3014	-.494	.3007	-.478	.2986	-.363	.2981	-.460
.3023	-.530	.3043	-.452	.3018	-.458	.2984	-.428
.3064	-.591	.3055	-.436	.3028	-.476	.3035	-.410
.3101	-.606	.3087	-.388	.3060	-.510	.3050	-.376
.3132	-.587	.3100	-.372	.3070	-.513	.3080	-.356
.3141	-.582	.3134	-.324	.3096	-.525	.3093	-.344
.3170	-.570	.3149	-.316	.3106	-.523	.3129	-.314
.3185	-.545	.3194	-.266	.3137	-.505	.3144	-.306
.3211	-.506	.3207	-.253	.3146	-.496	.3189	-.246
.3226	-.459	.3248	-.206	.3174	-.470	.3202	-.251
.3255	-.430	.3268	-.188	.3189	-.469	.3241	-.223
.3264	-.430	.3341	-.126	.3215	-.450	.3257	-.209
.3274	-.419	.3384	-.087	.3231	-.432	.3319	-.187
.3299	-.392	.3425	-.070	.3260	-.399	.3335	-.173
.3307	-.371	.3437	-.059	.3268	-.399	.3373	-.141
.3336	-.334	.3453	-.057	.3295	-.360	.3394	-.129
.3354	-.305	.3487	-.030	.3302	-.346	.3432	-.111
.3382	-.297	.3501	-.020	.3364	-.312	.3446	-.103
.3398	-.268	.3538	-.005	.3377	-.298	.3480	-.099
.3424	-.236	.3549	.011	.3389	-.258	.3495	-.100
.3432	-.241	.3589	.020	.3420	-.268	.3533	-.068
.3462	-.216	.3600	.014	.3427	-.259	.3543	-.064
.3480	-.182	.3642	.065	.3459	-.245	.3582	-.046
.3509	-.157	.3653	.042	.3475	-.195	.3596	-.043
.3518	-.155	.3688	.038	.3504	-.174	.3637	-.024
.3544	-.123	.3700	.039	.3512	-.174	.3648	.010
.3562	-.105	.3743	.041	.3540	-.147	.3683	-.009
.3588	-.127	.3759	.035	.3557	-.141	.3693	-.013
.3598	-.101	.3793	.014	.3584	-.127	.3732	-.016
.3629	-.091	.3804	0.000	.3593	-.124	.3750	.002
.3642	-.076	.3836	-.038	.3625	-.108	.3787	-.027
.3669	-.042	.3848	-.071	.3634	-.113	.3799	-.046
.3678	-.034	.3886	-.123	.3664	-.088	.3832	-.075
.3706	-.029	.3898	-.171	.3674	-.077	.3843	-.084
.3714	-.028	.3936	-.171	.3700	-.091	.3877	-.158
.3745	-.009	.3936	-.285	.3710	-.082	.3892	-.172
.3755	.022	.3950	-.322	.3738	-.068	.3927	-.251
.3787	0.000	.3984	-.460	.3749	-.056	.3943	-.283
.3802	.040	.3996	-.491	.3786	-.054	.3977	-.383
.3836	.026	.4009	-.528	.3795	-.042	.3991	-.412
.3847	.018	.4040	-.606	.3828	-.016	.4002	-.440
.3879	.017	.4051	-.616	.3841	-.041	.4014	-.462
.3889	.040	.4064	-.622	.3875	-.026	.4047	-.516
.3919	.038	.4075	-.621	.3884	-.020	.4057	-.519
.3957	.031	.4115	-.604	.3912	-.010	.4068	-.528
.3966	.026	.4126	-.606	.3923	-.018	.4104	-.514
.4007	.002	.4137	-.595	.3952	-.030	.4119	-.512
.4017	-.030	.4168	-.556	.3961	-.021	.4132	-.506
.4051	-.052	.4179	-.544	.4002	-.047	.4163	-.490
.4061	-.061	.4190	-.540	.4012	-.047	.4173	-.487
.4090	-.104			.4046	-.072	.4184	-.475

COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
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ON THE LIGHT CURVE AND PERIOD OF V743 Cen

During test runs of the newly installed double beam photometer at the 50 cm ESO photometric telescope the δ Scuti- or RR_S-star V743 Cen was continuously monitored on the nights April 18/19 and 19/20, 1976 in U,B,V. The photometer is identical to the Hoher List Observatory instrument, which was described by Geyer and Hoffmann (Mitt.Astron.Gesellschaft No.35,209,1974; Astron.& Astrophys. 38, 359,1975). The photometer allows the simultaneous photometric observations of the variable and a comparison star within the field of the telescope with fairly high time resolution. Data acquisition and preliminary on-line reductions are done with a HP 2100 computer system. On each night four consecutive cycles of the stars have been covered with an average of about 70 individual observations per cycle and colour. The photometric accuracy is about $\pm 0^m.003$ in all colours. As was already noticed by Kwan-Yu Chen (I.B.V.S.No.142,1966) and C.R. Chambliss (Mon.Not.R.astr.Soc.138, 437, 1968) the amplitudes of the B-light curves are quite small, and are less than $0^m.3$, which is conform with the present observations.Yet the amplitude variations are much larger, and also the shape variations of the light curve from one cycle to the next are much more pronounced than was anticipated by Chambliss. Both the maximum and minimum brightness, as well as the average brightness vary about 0.05 magnitudes. The following amplitude variations have been observed: A_V from $0^m.135$ to $0^m.188$; A_B from $0^m.192$ to $0^m.272$, and A_U from $0^m.180$ to $0^m.248$. In general these light curve changes resemble more the well known Blazko-effect than a beat period phenomenon. The maxima times of the U-,B-, V-light curve cycles were derived by using Pogson's method. Since there no colour dependent lag in the maxima times was found, the mean time instants for the three colours are given in the Table below. They are accurate to at least $\pm 0^d.0007$. Also listed are the maxima of Chen as given by Chambliss, those of Chambliss himself and by D.H.P. Jones (Mem.R.Astr.Soc.72,101, 1969).Since the period is so short, and about 9 years have elapsed between the latter observations and the previous ones it was not possible to establish the epoch number from the light elements given by Jones. Therefore the following linear light elements have been obtained with a least square solution and a "period finding program" written for a HP 9820 computer, assuming that no period change exceeding more than 6% of the period has taken place:

$$\text{Max.} = \text{J.D.hel.}2439243.6436 + 0^{d}.102254 \cdot E.$$

The period seems to be constant within $\pm 5 \cdot 10^{-6}$ days. The "noise" of the cycle length of the 1976 observations is ±1.92%. This explains the difficulties of Chambliss to reconcile his and Chen's observations.

Chambliss has classified V743 Cen as a δ Scuti star on account of its small light curve amplitude. The strong Blazko-effect as well as the period noise makes us believe to see in it an RR_S type star.

Table

Maxima of V743 Cen

Observer	Maxima J.D.hel. 2400000+	E	O-C
Chen	39243.6433	0	$-0^{d}.0003$
"	39243.7455	1	- .0003
"	39243.8520	2	.0039
"	39244.5642	9	.0004
"	39244.6660	10	- .0001
"	39244.7687	11	.0003
"	39244.8765	12	.0059
Jones	39594.474	3431	- .0042
"	39603.380	3518	.0056
Chambliss	39634.1525	3819	- .0004
"	39635.0740	3828	.0008
"	39636.0968	3838	.0010
"	39637.9335	3856	- .0028
"	39638.1368	3858	- .0041
"	39638.9520	3866	- .0069
Geyer/Vogt	42886.8633	35629	- .0006
" "	42887.6844	35637	.0025
" "	42887.7859	35638	.0017
" "	42887.8878	35639	.0014
" "	42888.6000	35646	- .0022
" "	42888.7014	35647	- .0031
" "	42888.8073	35648	.0006
" "	42888.9100	35649	.0010

Acknowledgement: The computations were performed on a HP 9820 calculator of the Deutsche Forschungsgemeinschaft (grant Schm.167/12). The observations have been collected at the European Southern Observatory, La Silla, Chile.

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Budapest
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OPTICAL PHOTOMETRY OF THE X-RAY NOVA A0620-00

The very bright transient X-ray source A0620-00 (V616 Mon) was discovered by the Ariel-5 satellite on August 3, 1975 (Elvis et al. 1975). The X-ray flux increased rapidly reaching a brightness $\sim$4 times that of Sco X-1 (Matilsky 1975).

The optical object corresponding to the X-ray source was identified by Boley and Wolfson (1975) from the X-ray position reported by the SAS-3 group (Matilsky 1975).

The present note gives results of photoelectric monitoring of the nova.

Initially observations were made with the 0.5 metre telescope at Sutherland using the Peoples' Photometer. Looking for short period variations, runs in B were made using 30 second integrations with a time resolution of 1-2 minutes.

Observations were made soon after the position of the optical object had been reported, but because of the star's proximity to the Sun at that time it was not possible to follow it for more than a few hours at a time.

A run of 1.7 hours was obtained on 22/23 August 1975, (JD 2442647.6), three other long runs were obtained in August and September.

Three standards were used: HD44700 which is about 3° from A0620-00 and at a greater zenith angle, HD44815 which is about 1° away, and E345 which is an E-region standard (Cousins and Stoy 1962) which is 50° away from the nova.

The light curves for the nova, together with the fluctuations of the standards used (to the same scale) are shown in Fig.1. The typical scatter of the points of the nova is $\sim$0.02 magnitudes.

The graphs demonstrate that there were short period fluctuations in A0620-00 with variations of up to 0.15 magnitudes in one hour. Other observations around this time were made by Duerbeck and Walter (1976). They suspected irregular fluctuations in brightness but their measures were not suitable spaced to determine a time scale.

Two other runs were made during which the brightness of the star varied by less than 0.03 magnitudes in an hour. Sample data of intervals of ~0.02 days for all these runs are shown in Table 1.

Later observations were made with the 1 metre telescope at Sutherland using the St Andrews photometer. The magnitudes and colours from these observations together with those from the 0.5 metre telescope are shown in Table 1. The observations in UBV are in the Johnson system and those in RI are in the Cape-Kron system (Cousins 1974).

The adopted values for the standards used are:

HD44700 : V : 6.400, B-V : -0.145, U-B : -0.62, V-R : -0.06, V-I : -0.15
HD44815 : V : 8.292, B-V : -0.057, U-B : -0.25, V-R : -0.25, V-I : -0.06
E345 : V : 5.764, B-V : -0.067, V-R : -0.023, V-I : -0.052

The V values for these observations, together with the visual magnitude estimates (Bortle 1975/76, Locher 1975) and photometric V magnitudes (French 1975, Kirshner 1975, Lyutyj 1976) reported in IAU circulars are shown in Fig.2.

The average decline for the first two magnitudes was 0.017 ± 0.001 magnitudes per day.

A secondary maximum in the X-ray flux was reported which lasted for the month of February 1976 followed by a sharp decline beginning on February 31/March 1 (Kaluzienski et al. 1976). Also a 7.8 day period in the X-ray flux has been reported (Matilsky 1976).

In the visible there was a corresponding increase in brightness in February which however was interrupted by at least two sharp deep minima. These minima would appear to have a depth of ~0.7 magnitudes and a width of ~6 days.

The time difference between these minima is 54.7 ± 0.3 days which would not conflict with 7 cycles of a 7.8 day period. But more data is required to confirm or deny this.

Acknowledgements:

We would like to thank Dr G. Wegner and Mr J.D. Laing for additional UBV observations and Dr M.W. Feast for many helpful discussions.

Table 1

B magnitudes and colours for A0620-00

J.D. hel	B	B-V	U-B	$V-R_{KC}$	$V-I_{KC}$
646.64	11.27				
.65	11.28				
.66	11.29				
647.60	11.28				
.63	11.36				
.66	11.39	0.17			
648.62	11.38	0.16		0.20	0.40
.64	11.36				
.65	11.33	0.17			
.66	11.34				
650.60	11.29				
.62	11.31				
.64	11.34	0.18		0.30	0.37
.66	11.37				
653.65	11.42	0.21	-0.76		
654.64	11.47	0.24	-0.77		
659.66	11.62	0.24	-0.77		
679.51	11.90				
.53	11.93				
.55	12.00				
.77	12.04				
681.50	11.98				
.52	12.00				
.54	12.05	0.24			
.56	12.07	0.24			
.58	12.10	0.23	-0.74	0.34	0.59
.60	12.11				
.62	12.12				
.63	12.09				
701.60	12.23	0.22	-0.71		
758.48	13.26	0.24		0.34	0.56
774.53	13.66	0.30			0.61
790.32	13.58	0.32			0.57
791.49	13.65	0.31			0.57
792.32	13.75	0.31		0.31	
.52	13.74	0.28	-0.67		
793.32	13.87	0.35			0.62
795.36	14.14	0.34			0.48
796.49	14.10	0.41			0.43
830.32	13.50	0.29	-0.60		
848.75	13.97	0.26	-0.68		
849.29	14.15	0.27	-0.69		
850.27	14.18	0.31	-0.68		
851.27	14.13	0.32	-0.63		
852.27	13.76	0.31	-0.52		

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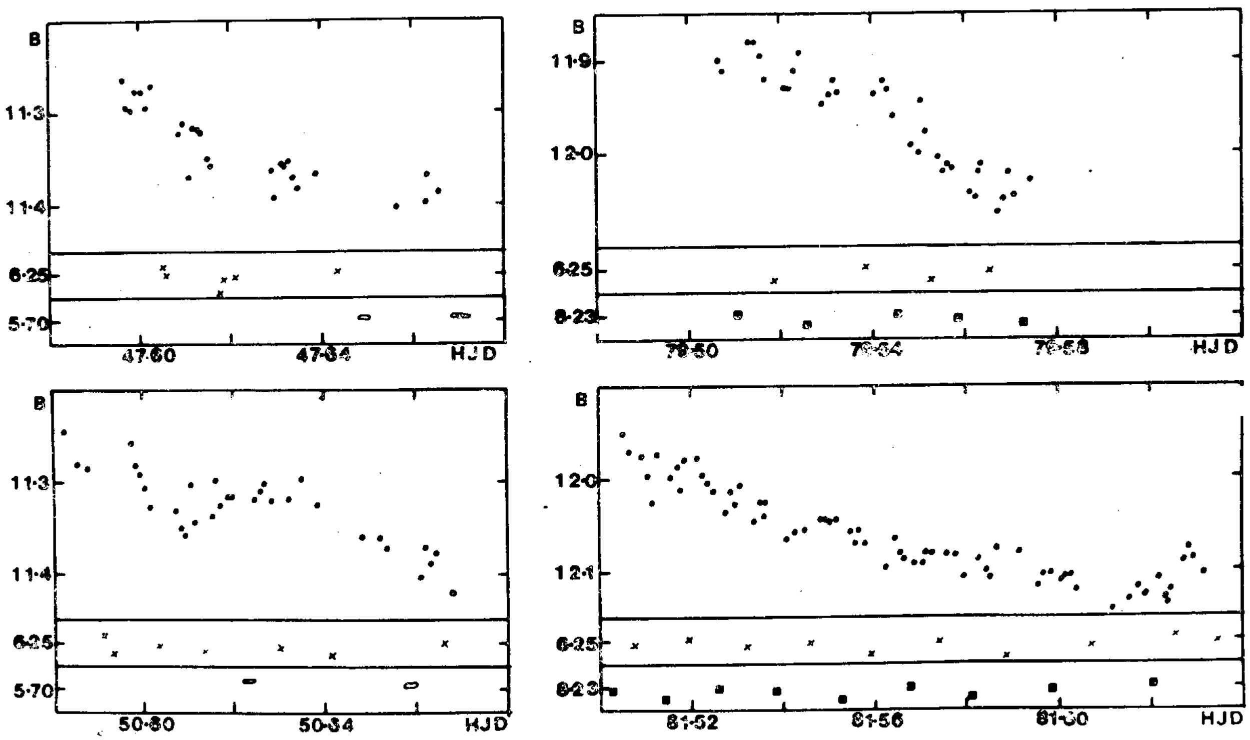

Fig.1. Fluctuations in B for A0620-00 against HJD (2441600+). The standards done at the same time are also shown. Symbols used: Circles:•:A0620-00; Crosses:x: HD44700; Open Ovals: ⬭ : E345; Squares: ▪ : HD44815.

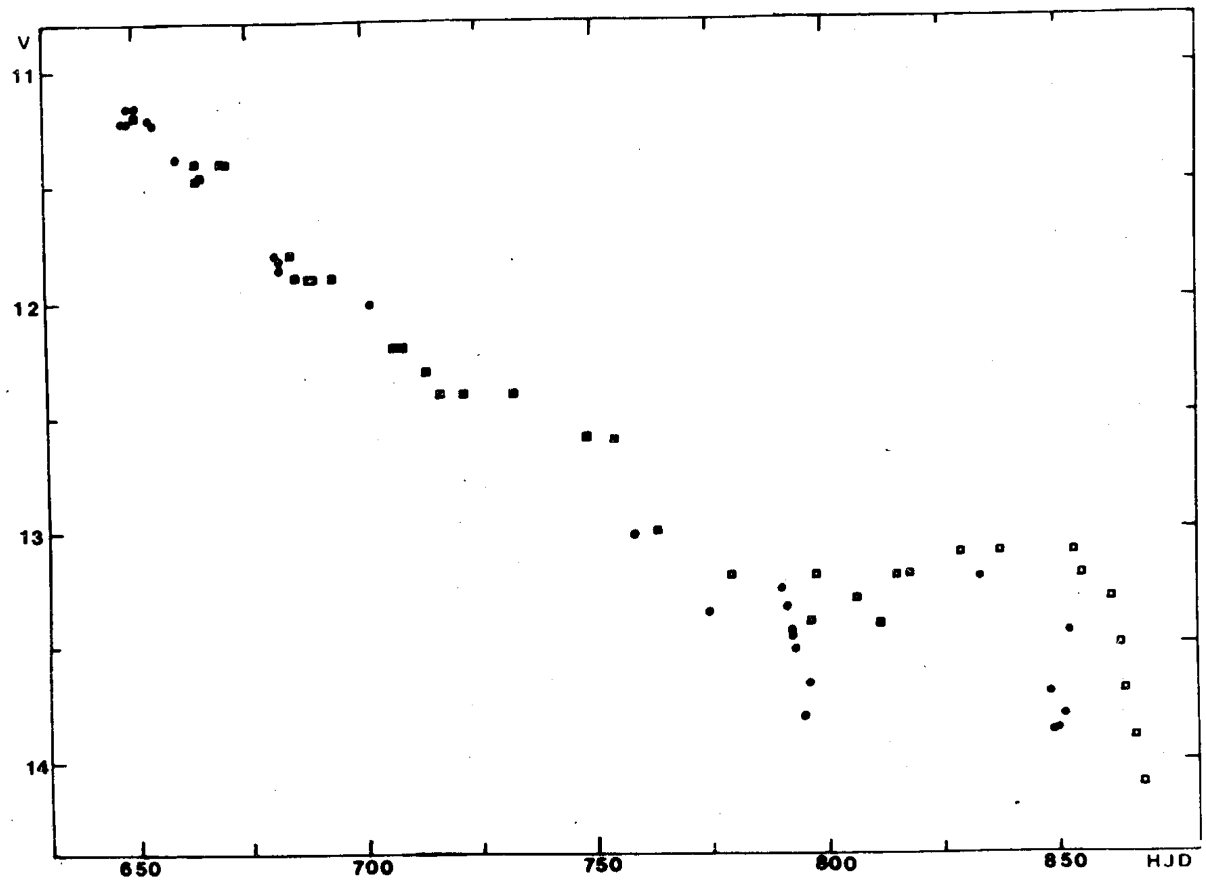

Fig. 2. Light curve in V for A0620-00 against HDJ (2441000+). Symbols used: Circles:•:S.A.A.O. observations at Sutherland; open Squares:▫ :magnitudes reported in IAU circulars.

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Konkoly Observatory
Budapest
1976 September 7

EVIDENCE FOR A PERIOD CHANGE IN THE ECLIPSING BINARY RY Gem*

Two epochs of minimum light of the eclipsing binary RY Gem were determined during winter of 1975-76 by means of a series of observations carried out with the 45 cm reflector of the Astronomical Observatory of Torino. We used a photoelectric photometer equipped with a photomultiplier EMI 6256 S and a V filter.

All the times of minimum light we could find in the literature are collected in Table 1. The epoch No.11 was evaluated by the authors using the time of end of totality, given by McKellar (1951) with an uncertainty of $0^{d}.007$, and the duration of totality ($5^{h}.26$) was estimated from our primary minimum. Assuming the linear ephemeris:

1) $\mathrm{Min_I(Hel.)} = 2427483.642 + 9^{d}.300706 \cdot E$

we derived the $(O-C)_1$ (see Table 1) of all the listed epochs of primary minimum. These residuals are plotted in Figure 1. It is seen at once that this representation is not satisfactory; it seems more advantageous to consider the epochs before and after about E=+600 separately. A linear ephemeris suggests itself for each group (from now on "labelled" A and B for E<+600 and E>+600, respectively). In the analysis normal minima were used; two of them, nos.4 and 5 (see Table 2), were given by Lause (1936) but the minima nos.2, 3,7,8 were calculated by the writers. The weights were assigned inversely proportional to the square of the estimated error. A least-square treatment for the two groups has led to the formulae:

A) $\mathrm{Min_I(Hel.)} = 2427827.7580 + 9^{d}.300876 \cdot E$
$\pm.\ 14 \quad \pm.\ 6$

B) $\mathrm{Min_I(Hel.)} = 2442792.5190 \quad 9^{d}.300526 \cdot E$
$\pm.\ 3$

*During the draft of this note, we read in Acta Astronomica (1976, 26, 109) that a similar study had been made by D.S. Hall and T. Stuhlinger. The conclusions about a period change and the deduced periods are in excellent agreement with ours.

The period seems to have undergone a rather drastic change even if a large observational error in the epoch No.11 of Table 1 could conceal a rapid but continuous change in a short time interval.

Table 1

Individual observed minima of RY Gem

No.	J.D. Hel.	E	$(O-C)_1$	Observer
1	2418015.32	-1018	-0.20	Blazko
2	23800.484	- 396	-0.078	Beyer
3	24628.262	- 307	-0.063	Beyer
4	27483.642	0	0.000	Lause
5	27827.744	+ 37	-0.024	Lause
6	27874.265	+ 42	-0.007	Lause
7	27883.563	+ 43	-0.009	Lause
8	28106.772	+ 67	-0.017	Lause
9	28209.090	+ 78	-0.007	Lause
10	28246.300	+ 82	0.000	Lause
11	32245.67	+ 512	+0.07	McKellar
12	38681.700	+1204	-0.008	Kumsiashvili
13	38700.285	+1206	-0.008	Kumsiashvili
14	38737.485	+1210	-0.011	Kumsiashvili
15	38765.385	+1213	-0.013	Kumsiashvili
16	39416.385	+1283	-0.063	Kumsiashvili
17	39593.100	+1302	-0.061	Kumsiashvili
18	39769.900	+1321	+0.025	Kumsiashvili
19	39779.150	+1322	-0.025	Kumsiashvili
20	42792.521	+1646	-0.083	Present work
21	42820.419	+1649	-0.087	Present work

Table 2

Normal minima of RY Gem

No.		J.D. Hel.	W	E_A	$(O-C)_A$	Observer
1		2418015.32 ± 0.02	0.5	-1055	-0.014	Blazko
2		23800.484 ± 0.010	1	- 433	+0.005	Beyer
3	A	24628.262 ± 0.010	1	- 344	+0.005	Beyer
4		27827.7615 ± 0.0041	6	0	+0.004	Lause
5		28209.0912 ± 0.0034	8	+ 41	-0.003	Lause
6		32245.67 ± 0.01	1	+ 475	-0.004	McKellar
				E_B	$(O-C)_B$	
7		2438700.288 ± 0.008	2	- 440	0.000	Kumsiashvili
8	B	39593.131 ± 0.038	0.1	- 344	-0.007	Kumsiashvili
9		42792.519 ± 0.003	11	0	0.000	Present work

Table 2 summarizes the obtained results. The columns give: the normal minima with their estimated errors, the weights, the number of cycles E_A and E_B elapsed from the epochs nos.4 and 9, respectively, the $(O-C)_A$ and $(O-C)_B$ relative to the ephemeris A) and B),the observer.

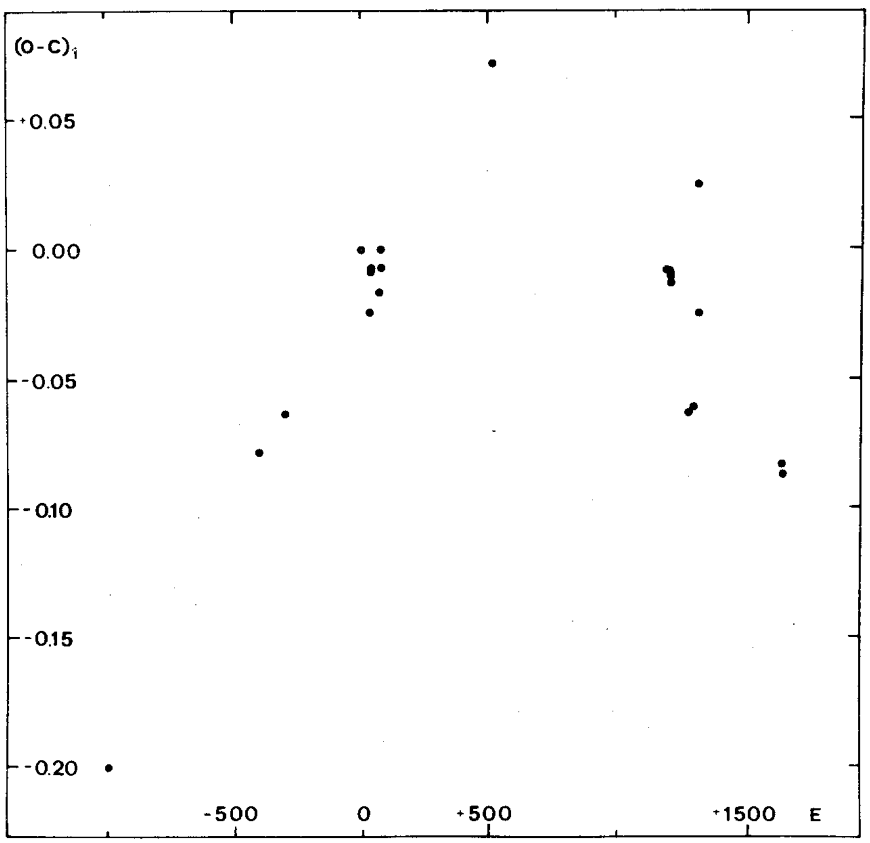

Figure 1 - (O-C)'s of the observed epochs of primary minimum of RY Gem according to the ephemeris 1) (see text).

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CA II EMISSION IN THE RS CVn STAR HR 1099

Recently HR 1099 (ADS 2644A) a G-type star with strong Ca II H and K reversals, has been shown to be an RS CVn binary, in fact the brightest known member of the class (Bopp and Fekel 1976; Landis and Hall 1976). In a survey of seven RS CVn stars (not including HR 1099), Weiler (1976) reported variations in the H and K and Hα emission lines. In several cases, the phase of emission maximum coincided with the minimum of the wavelike distortion that is often present in these systems.

Spectrograms suitable for an investigation of possible variability in the H and K lines of HR 1099 were obtained at Kitt Peak National Observatory during December 1974. The spectra were obtained with the No. 2 0.9m reflector and Cassegrain spectrograph; the dispersion was 63 Å mm^{-1}. The spectra were widened to 0.6 mm and are well exposed in the λλ3900-4000 region. The dispersion used was insufficient to resolve the components of the double-line spectroscopic binary. From high dispersion spectra (Bopp and Fekel 1976) it is known that the primary (more massive) component has emission several times stronger than the secondary. Thus the lower dispersion data essentially test only the primary for Ca II variability.

Microdensitometer tracings of eleven spectra were made at Ritter Observatory. We measured equivalent widths of H and K relative to the interpolated local continuum. Though this required some subjective estimates of line profile and continuum placement, random errors should be comparable to those of ordinary photographic equivalent width measures (~15%).

CA II EMISSION IN HR 1099

Plate #	HJD 2442000+	ϕ(ORB)	ϕ(PHOT)	EW(Å) K	EW(Å) H
5494a	405.646	0.754	0.379	0.77	1.18
5494b	405.669	0.762	0.386	0.95	1.21
5494d	405.766	0.796	0.421	1.00	1.48
5498a	406.734	0.138	0.763	1.16	1.61
5500a	408.648	0.812	0.437	1.05	1.52
5500c	408.692	0.828	0.453	0.85	1.78
5504c	409.659	0.168	0.793	1.28	1.25
5507c	410.610	0.503	0.128	1.31	1.65
5508a	410.640	0.514	0.139	1.42	1.44
5508b	410.648	0.517	0.142	1.29	1.78
5509b	411.660	0.873	0.498	1.16	1.30

The results are given in the table , where orbital phases, ϕ(ORB) are computed from

$$T_0(JD) = 2442763.909 + 2.83782\ E$$

and the phase of the distortion wave, ϕ(PHOT) is computed with the same period, but epoch $T_0(JD) = 2442770.65$.

The data show no convincing evidence of variation in the Ca II H-line. There may be some variability evident in the K-line, with minimum equivalent width being seen near $\phi(PHOT) \sim 0.4-0.5$. This corresponds to the phase of broad-band photometric maximum and resembles the behavior seen in Weiler's observations of other RS CVn variables. Further spectroscopy of HR 1099 is clearly needed.

I am grateful to Dr. W. Sandmann for assistance during the observations.

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PHOTOELECTRIC DIFFERENTIAL PHOTOMETRY OF THE CONTACT BINARY AW UMa

The W UMa type contact binary AW UMa had been largely ignored until recently. Attention has been drawn to this interesting system by the excellent work of Dworak and Kurpinska (1975). We report additional observations obtained incidential to a program reported elsewhere (McMillan et al. 1976). They were obtained with the McDonald Observatory 91 cm reflector using a convencional single channel pulse counting photometer. The data of Table 1 were obtained with a dry ice refrigerated EMI 9658a together with a Strömgren y filter while Table 2 data were obtained with a dry ice refrigerated 1P21 and standard Johnson V filter. Two comparison stars (BD +30 2163, BD +33 2123) were observed in sequence with the program star and were used to correct for slow sensitivity and transparency changes. The observational and reduction techniques are described further in McMillan et al. (1976).

The data of Table 1 are of extraordinarily high precision ($1\sigma = 0\overset{m}{.}001$ formal error on the comparison stars) while those of Table 2 are of somewhat lower quality ($1\sigma = .035$). The tables list heliocentric time of observation, phase calculated from the ephemeris of Dworak and Kurpinska (1975), and our differential magnitudes with an arbitrary additive constant.

We confirm the Dworak and Kurpinska (1975) ephemeris. In addition it would be of interest to compare the accurate data of Table 1 with the Dworak and Kurpinska (1975) normal points. We have transformed our differential y magnitudes to their V system by solving for the additive constant to make our data agree with their values. Second order differences between our y and their V should be negligible since intrinsic color variations are quite small for stars of this type. Our data usually agree with their normal points to within $0\overset{m}{.}004$ although we have found potions of the light curve which had changed. In particular, our data near phase 0.075 are systematically $0\overset{m}{.}015$ brighter than their values, in agreement with the larger noise in their normal points at this phase.

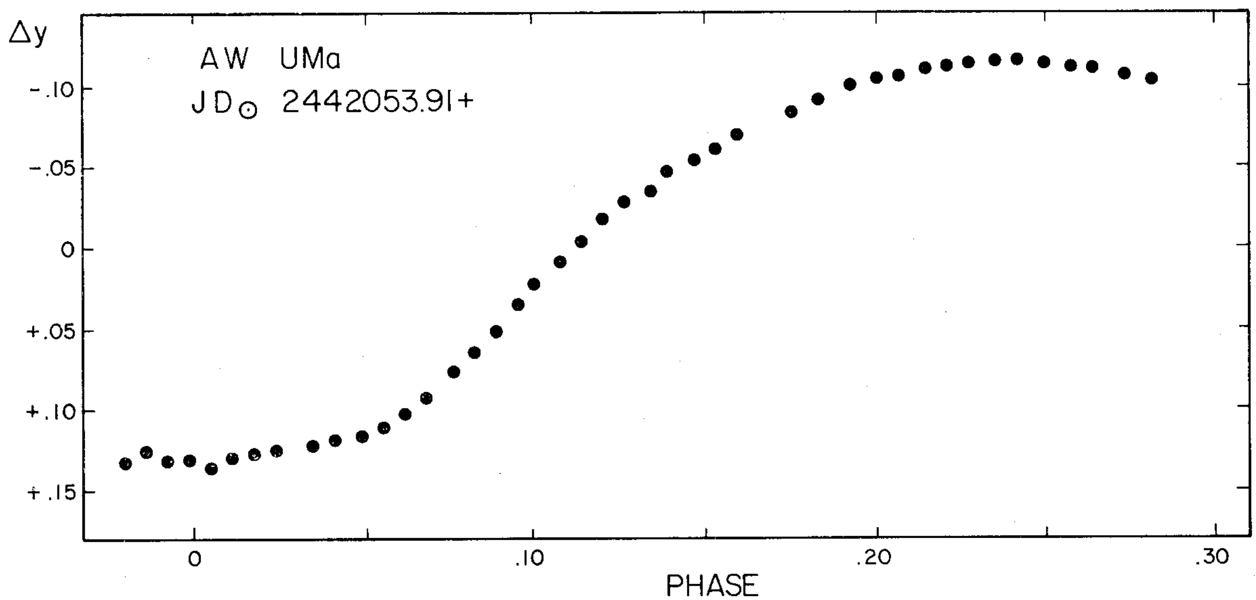
Δy
AW UMa
JD⊙ 2442053.91+
-.10
-.05
0
+.05
+.10
+.15
0
.10
.20
.30
PHASE

Table 1

JD hel 2442000+	Phase*	Δy mag.	JD hel 2442000+	Phase	Δy mag.
53.9086	.9798	-.1321	53.9732	.1270	.0290
53.9114	.9862	-.1254	53.9766	.1350	.0363
53.9141	.9925	-.1310	53.9787	.1397	.0474
53.9169	.9988	-.1306	53.9822	.1476	.0556
53.9197	.0052	-.1351	53.9850	.1540	.0625
53.9225	.0115	-.1291	53.9877	.1603	.0713
53.9252	.0178	-.1269	53.9947	.1761	.0853
53.9280	.0242	-.1244	53.9982	.1840	.0926
53.9329	.0352	-.1217	54.0023	.1935	.1019
53.9357	.0416	-.1181	54.0058	.2014	.1064
53.9391	.0495	-.1156	54.0086	.2078	.1077
53.9419	.0558	-.1102	54.0121	.2157	.1125
53.9447	.0622	-.1018	54.0148	.2220	.1140
53.9475	.0685	-.0924	54.0176	.2284	.1159
53.9509	.0764	-.0765	54.0211	.2363	.1166
53.9537	.0827	-.0640	54.0239	.2426	.1177
53.9565	.0891	-.0511	54.0273	.2505	.1155
53.9593	.0954	-.0348	54.0308	.2584	.1132
53.9614	.1001	-.0218	54.0336	.2648	.1124
53.9648	.1081	-.0075	54.0378	.2743	.1082
53.9676	.1144	.0050	54.0412	.2822	.1052
53.9704	.1207	.0184			

Table 2

JD hel 2442000+	Phase	ΔV	JD hel 2442000+	Phase	ΔV
205.6522	.8482	.1522	205.6988	.9543	-.0391
205.6550	.8546	.1228	205.7029	.9638	-.0233
205.6578	.8609	.1146	205.7071	.9733	-.0527
205.6613	.8688	.1466	205.7099	.9796	-.0792
205.6640	.8751	.1040	205.7126	.9859	-.0520
205.6668	.8815	.0891	205.7154	.9923	-.0562
205.6703	.8894	.0514	205.7182	.9986	-.0317
205.6731	.8957	.0440	205.7210	.0049	-.0687
205.6751	.9005	.0295	205.7231	.0097	-.0429
205.6786	.9084	.0147	205.7258	.0160	-.0537
205.6821	.9163	-.0016	205.7286	.0223	-.0561
205.6849	.9226	-.0203	205.7321	.0302	-.0539
205.6876	.9289	-.0201	205.7349	.0366	-.0196
205.6918	.9385	-.0447	205.7383	.0445	-.0158
205.6960	.9479	-.0295	205.7439	.0572	-.0189

*From JD hel Min I = 2438044.7812 + 0.4387334·E.

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Number 1177

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Budapest
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THE NATURE OF THE VARIABLES IN M13

Osborn and Rosenzweig (IBVS No 1126,1976) recently suggested that available photometry of variable No. 1 in M13 shows the presence of a bump in the light curve at a phase which when correlated with theoretical models (Stobie, Observatory 93,111,1973) would imply a mass of $0.2M_{\odot}$. In view of the importance of such a result for understanding the evolution of globular cluster stars we have obtained improved photographic photometry of this and other variables in M13.

The observational material consists of a series of B & V plates taken with the 100" Mt Wilson reflector and kindly loaned to us by Dr Margaret Penston. We have calibrated the plates using the photometry of Cathey (A.J. 79, 1370, 1974). The analysis of the V plates is now complete and the descending branch of the light curve of variable 1 is well covered by the observations but shows no evidence for the suggested bump. On the other hand the curve appears to show a bump on the rising branch which according to the precepts of Stobie gives $R= 8.7R_{\odot}$ and $M = 0.55M_{\odot}$. These are more in line with the values normally associated with the later stages of evolution in globular clusters.

Our data have further us to estimate the mean magnitudes of the RR Lyrae stars, variables Nos. 5, 8 and 9 which we find to be significantly fainter than the values adopted by Sandage (Ap.J., 162,841, 1970). These stars therefore do occur at the magnitude level of the horizontal branch in M13 and it is no longer necessary to consider them as extraordinary in this respect.

Reduction of the data to obtain colours for the variables is in progress and full details will be published elsewhere.

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Budapest
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PHOTOMETRIC OBSERVATIONS OF LX PERSEI

LX Persei (BD+47°781, BV 307, R.A. (1900) $03^h06^m.4$, Dec. (1900) +47°43!5, V = 8.20) was reported to be an eclipsing variable by Strohmeier *et al.* (1962). The depth of the primary eclipse was about $1^m.1$ (photographic), but no secondary eclipse was detected. FitzGerald (1964, 1974) and Weiler (1974) have studied the system spectroscopically, and have found it to consist of two G-type stars (G5IV + G5IV?) of nearly equal mass. One component has strong CaII emission; for this and other reasons, LX Per is a strong candidate for inclusion in the "RS CVn" class of eclipsing binary stars (Hall, 1972).

FitzGerald (1964) noted that the spectroscopic properties of LX Per were inconsistent with the lack of a secondary eclipse. For this reason, photometric observations of this star were made, primarily to search for such an eclipse.

OBSERVATIONS: Observations were made in 1967 using the 48 cm reflector at the David Dunlap Observatory, and in 1970 using the no. 3 41 cm reflector at Kitt Peak National Observatory. The comparison star was HD 20192 (m = 7.8, spectral type G9II). Magnitudes were corrected for differential extinction and were reduced to differential values on the UBV system. This was accomplished by use of appropriate filters and by reference to secondary UBV standards in the α Persei cluster. Phases were calculated using the epoch JD 2427033.120 given in the *General Catalogue of Variable Stars* and the best spectroscopic period 8.038207 (± 0.000117) days, covering the period 1962 to 1973 (FitzGerald 1974). The results are presented in the table and shown on the figure.

DISCUSSION: The shoulder of the secondary eclipse was observed successfully on two dates. The eclipse has a depth of at least $0^m.165$ in both B and V light. The similar behaviour in both B and V light is consistent with the near-identical properties of the two components of the system.

The phase of secondary eclipse is not the same on the two dates JD 2439825 and JD 2440886. This may be due to period changes between 1962 and 1973, or due to a real variation in the phase of secondary eclipse in a system of constant period. Fitting the two secondary eclipses together produces a period of 8.038500 day, which is not consistent with the spectroscopic period of 8.038207 (± 0.000117) days. On the other hand, several other "RS CVn" stars show variations in the phase of secondary eclipse. Further photometric observations of this system would be desirable, but the near-integral period makes the system difficult to observe.

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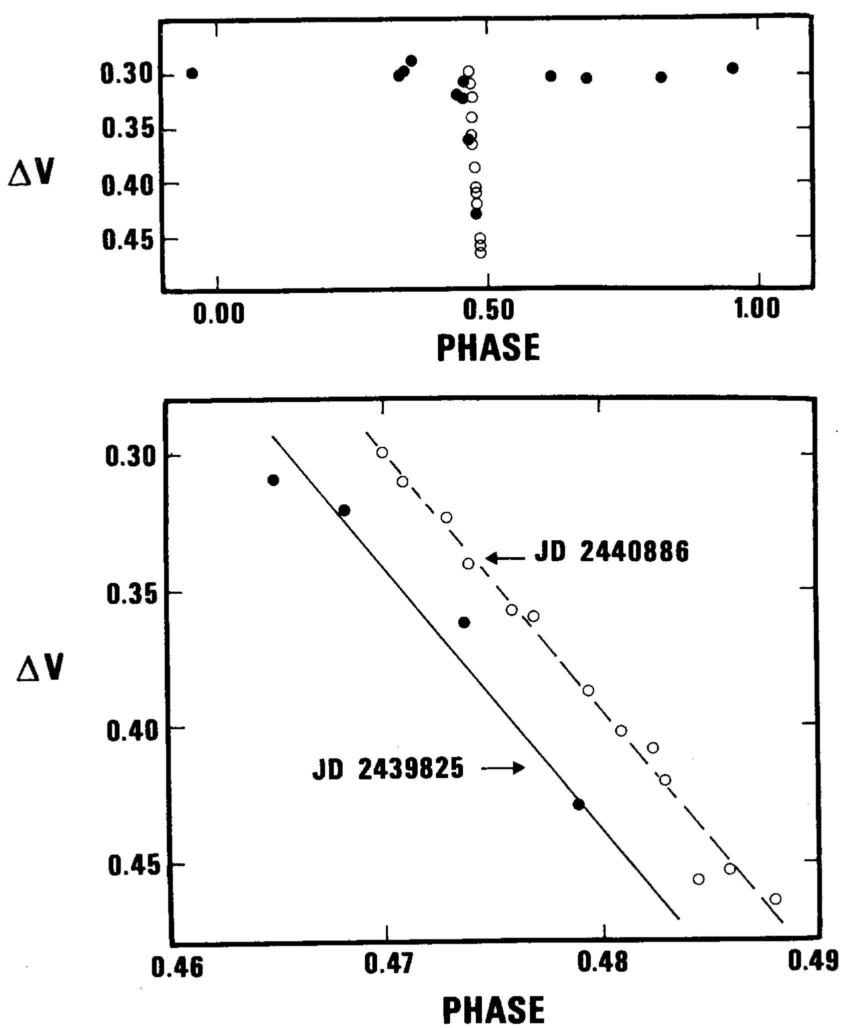
TABLE

JD	Cycle and Phase	ΔV	ΔB
2439786.6889	1586.6186	0.304	
800.5729	1588.3459	0.297	
.6778	.3589	0.286	
825.5097	1591.4482	0.320	
.6451	.4650	0.309	
.6722	.4684	0.321	
.7139	.4736	0.362	
.7563	.4788	0.429	
829.6000	.9570	0.297	
844.6167	1593.8252	0.305	
851.5542	1594.6882	0.305	
2440886.7271	1723.4698	0.299	
.7368	.4710	0.310	
.7542	.4732	0.324	
.7653	.4746	0.341	−0.014
.7799	.4764	0.358	−0.006
.7868	.4772	0.360	+0.013
.8042	.4794	0.387	+0.027
.8160	.4809	0.402	+0.015
.8285	.4824	0.408	+0.051
.8333	.4830	0.421	+0.059
.8451	.4845	0.458	+0.068
.8563	.4859	0.453	+0.088
.8694	.4875	0.465	+0.104



ΔV
0.30
0.35
0.40
0.45
0.00
0.50
1.00
PHASE
ΔV
0.30
0.35
0.40
0.45
JD 2440886
JD 2439825
0.46
0.47
0.48
0.49
PHASE

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UBVRI PRIMARY AND SECONDARY ECLIPSE CURVES OF RW TAURI

RW Tauri, BD+27°623, is the first eclipsing binary system in which the presence of gas streaming was established, and a gaseous ring around the B component was postulated by Joy (P.A.S.P. 54, 35, 1942; P.A.S.P. 59, 171, 1947). According to Plavec (B.A.C. 13, 224, 1962) the marked eccentricity of the spectrographic orbit is probably spurious, resulting from the gas streaming. However, up to the time of the present observations there was no direct proof from photometric observations that the true orbit is nearly circular since the secondary minimum had not been observed.

The present observations were made in 1967-68 with the Johnson UBVRI photometer attached to the 0.7 m and the 1.5 m telescopes then housed at the Catalina Observatory of the University of Arizona. The photometer houses two cooled photomultiplier tubes. A movable mirror in the light path permits the directing of the beam to the RCA 1P21 for the UBV observations or to the RCA 7102 for the RI observations.

Approximately 250 observations were obtained at each effective wavelength. BD+27°628 and BD+27°629 were used as the comparison and check stars, respectively; and on several nights a network of standard stars was also observed. Figure 1 shows the light curve as defined by the I observations. The phases were computed from the ephemeris determined by Maddox (to be published, 1976), JD Hel. Min. I = 2440160.3771 + $2^{d}.7688425$ E. The observations have not been corrected for the light of the visual companion, which is at a separation of about 1".

The observations have been prepared for publication and anyone wishing a tabulation prior to publication should contact the author.

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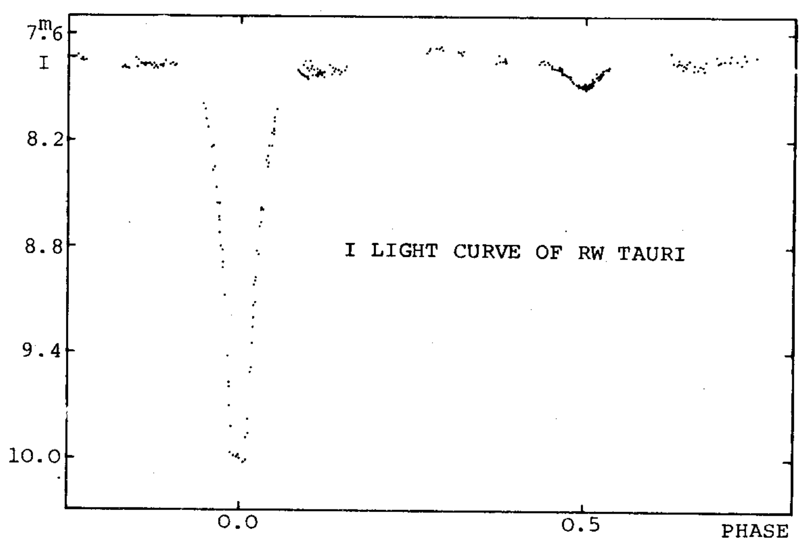

7.6
I
8.2
8.8
9.4
10.0
I LIGHT CURVE OF RW TAURI
0.0
0.5
PHASE

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Number 1180

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Budapest
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PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR YZ CMi

Continuous B-band photometry of flare activity of YZ CMi was carried out as a collaborative observing programme of the flare stars. The star was monitored on the Sampurnanand 104-cm reflector equipped with a refrigerated EMI 6094S photomultiplier, for a total of 24^h39^m spread over 7 nights during December 1975. The stellar intensity was measured against sky back ground only, without observing any comparison star.

The actual monitoring intervals are given in Table I and the flare characteristics of all the 12 recorded flares are given in Table II. The light curves in relative intensity scales versus Universal Time are given in Figs. 1-12. All the flares are combinations of spike and slow events. In case of flare No.3, which is a very rapid event, the peak could not be covered for a small interval due to instrumental limitations. Flare No.6 is a combination of two spike events which could not be separated.

The areas under the light curves were planimetered to derive a measure of the total energy radiated by a flare. The quiescent state luminosity in B band is taken to be 2.061×10^{29} ergs/sec.

The author is thankful to Dr.S.D. Sinvhal for suggestions and guidance. Part of this work was carried out with financial assistance with PL-480 funds under Smithsonian Institution Project No.SFG-O-6425.

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Reference:

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Table I

Monitoring Intervals

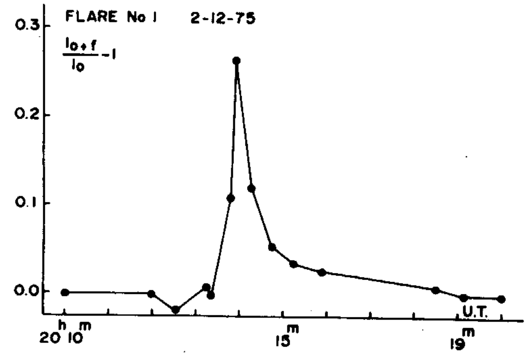
(Times rounded off to nearest minute of U.T.)

Date Dec. 1975	Interval	
2	20^h01^m - 22^h48^m	, except for 6 breaks totalling 10 minutes.
4	18 53 - 22 52	, except for 5 breaks totalling 6 minutes.
6	19 02 - 21 11	, except for 4 breaks totalling 7 minutes.
7	18 54 - 23 27	, except for 8 breaks totalling 30 minutes.
8/9	18 51 - 19 23	, except for 1 break totalling 1 minute.
	19 39 - 20 26	
	20 41 - 20 51	, except for 1 break totalling 1 minute.
	21 08 - 00 02	, except for 5 breaks totalling 10 minutes.
9/10	18 51 - 22 03	, except for 4 breaks totalling 6 minutes.
	22 19 - 23 04	, except for 1 break totalling 3 minutes.
	23 18 - 00 12	, except for 2 breaks totalling 4 minutes.
10/11	18 54 - 00 22	, except for 12 breaks totalling 16 minutes.

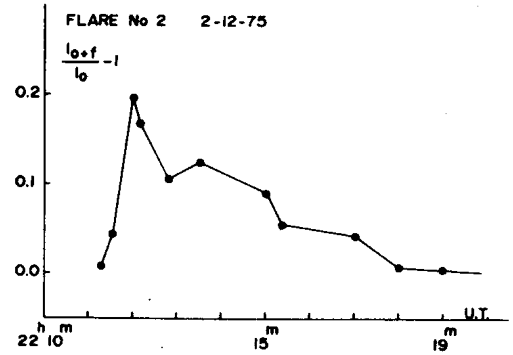
Table II

Characteristics of the Flares on YZ CMi (dm 4.5e: V=11.24; B-V=1.58)

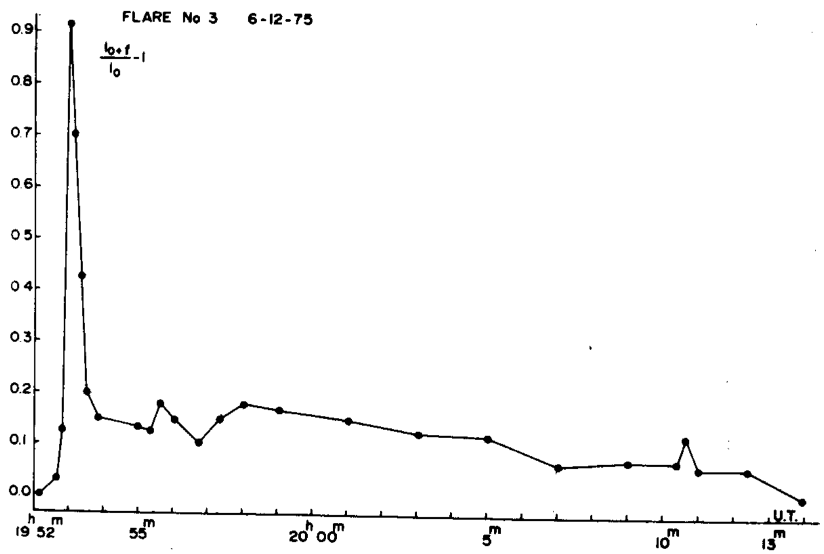
Flare No.	Date Dec. 1975	U.T. max.	Flare duration (in minutes) Before max. t_b	After max. t_a	$\frac{I_{o+f}}{I_o}$	Δm_B	$\frac{\sigma}{X_s}$	P (min)	F(z)	Energy released at flare max 10^{29} ergs/s	Total emission during the event 10^{30} ergs
1	2	$20^h13^m54^s$	0.55	5.25	1.277	.265	.013	0.243	1.192	2.63	3.01
2	2	22 12 00	0.70	8.00	1.196	.194	.001	0.516	1.119	2.46	6.39
3	6	19 53 00	0.85	22.00	1.915	.705	.045	2.575	1.203	3.94	31.84
4	8	18 59 40	1.30	3.80	1.150	.151	.012	0.450	1.330	2.37	5.56
5	8	23 31 40	1.13	6.53	1.194	.192	.010	0.773	1.320	2.46	9.56
6	9	20 08 51	0.27	4.00	1.183	.182	.010	0.925	1.15	2.43	} 11.43
		20 13 20	0.25	6.00	1.267	.256	.010	-	1.15	2.61	
7	9	20 58 45	0.25	2.10	1.243	.236	.012	0.112	1.24	2.56	1.38
8	9	21 22 30	0.65	7.50	1.125	.127	.025	0.331	1.11	2.32	4.09
9	9	23 46 10	0.80	1.15	1.121	.124	.013	0.092	1.39	2.30	1.13
10	10	18 00 25	0.57	8.6	1.985	.746	.015	1.070	1.30	4.09	13.31
11	10	21 58 05	0.45	3.9	1.194	.192	.012	0.875	1.134	2.46	10.82
12	10	22 19 45	0.15	1.15	1.328	.307	.012	0.193	1.164	2.73	2.39



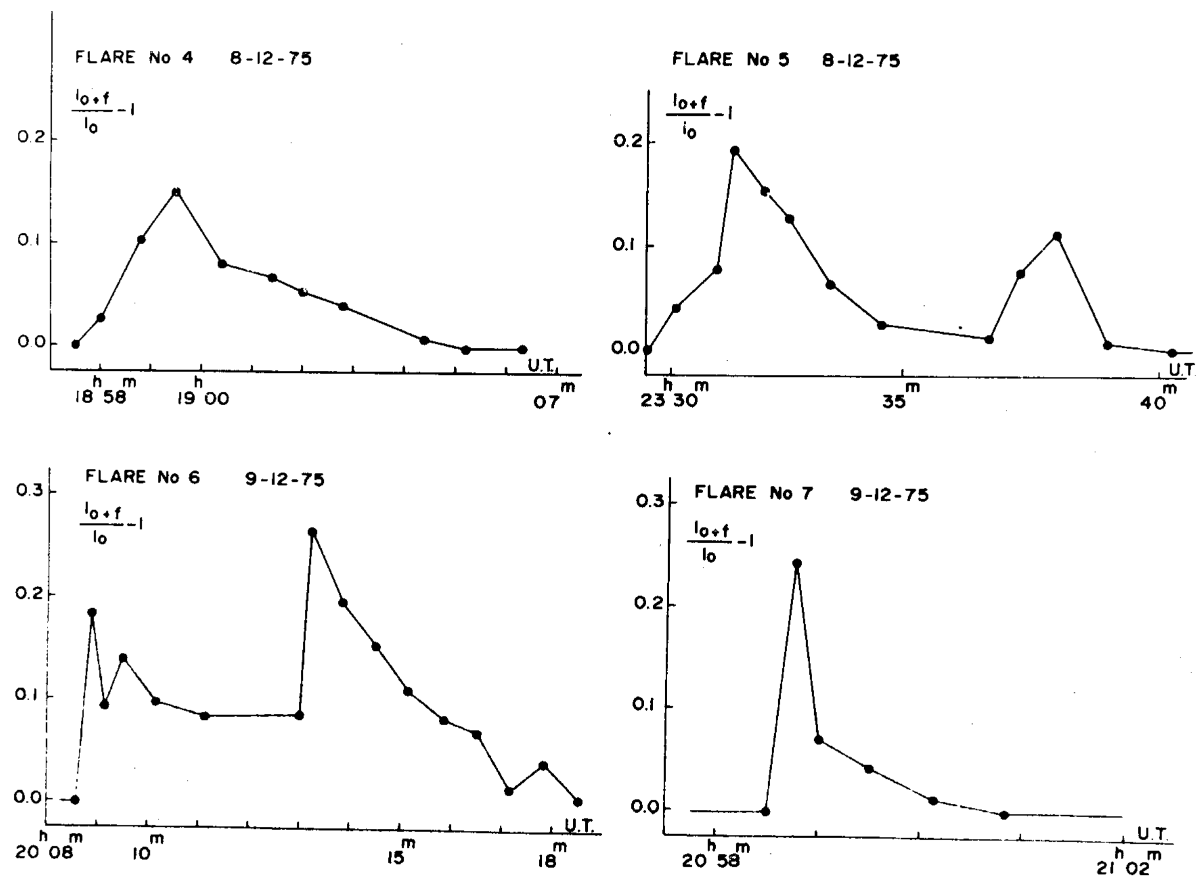
FLARE No 1 2-12-75
$\frac{I_{o+f}}{I_o}-1$
0.3
0.2
0.1
0.0
$20^h 10^m$
15^m
19^m
U.T.



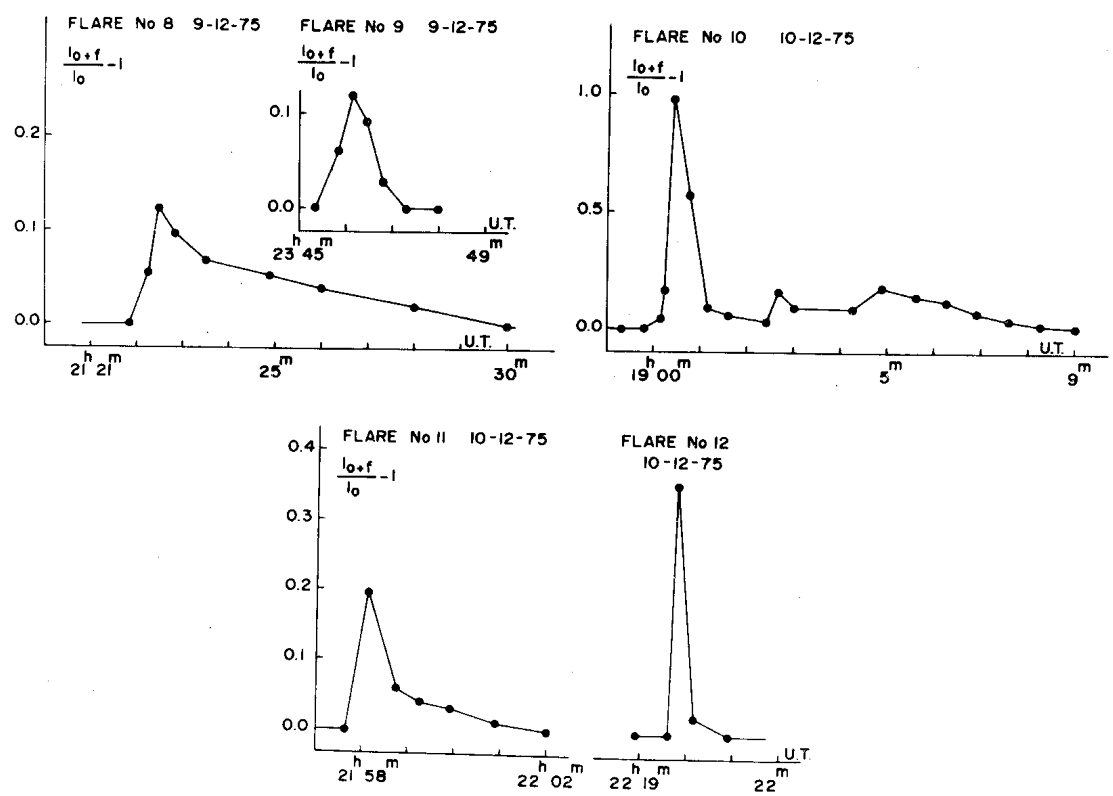
FLARE No 2 2-12-75
$\frac{I_{o+f}}{I_o}-1$
0.2
0.1
0.0
$22^h 10^m$
15^m
19^m
U.T.



FLARE No 3 6-12-75
$\frac{I_{o+f}}{I_o}-1$
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
$19^h 52^m$
55^m
$20^h 00^m$
5^m
10^m
13^m
U.T.



FLARE No 4 8-12-75
FLARE No 5 8-12-75
FLARE No 6 9-12-75
FLARE No 7 9-12-75
U.T.



FLARE No 8 9-12-75
FLARE No 9 9-12-75
FLARE No 10 10-12-75
FLARE No 11 10-12-75
FLARE No 12 10-12-75
$\frac{I_{o+f}}{I_o} - 1$
U.T.
21h21m
25m
30m
23h45m
49m
19h00m
5m
9m
21h58m
22h02m
22h19m
22m

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1181

Konkoly Observatory
Budapest
1976 September 23

PHOTOELECTRIC OBSERVATIONS OF THE FLARE STAR BY Dra IN 1973,1974

Continuous photoelectric monitoring of the flare star BY Dra has been carried out at the Stephanion Observatory ($\lambda=-22^{\circ}49'44''$ $\varphi=+37^{\circ}45'15''$) during the years 1973, 1974 using the 30-inch Cassegrain reflector of the Department of Geodetic Astronomy, University of Thessaloniki. Observations have been made with a Johnson dual channel photoelectric photometer in the B colour of the international UBV system. The telescope and photometer will be described elsewhere. Here we mention only that the transformation of our instrumental ubv system to the international UBV system is given by the following equations:

$$V = v_o + 0.053(b-v)_o + 2.380,$$
$$B - V = 0.858 + 1.043(b-v)_o,$$
$$U - B = -1.782 + 1.020(u-b)_o.$$

The monitoring intervals in UT as well as the total monitoring time for each night are given in the Tables Ia, Ib. Any interruption of more than one minute has been noted. In the fourth column of Tables Ia, Ib the standard deviation of random noice fluctuation $\sigma(mag) = 2.5 \log(I_o+\sigma)/I_o$ for different times (UT) of the corresponding monitoring interval is given.

During the 60.63 hours of monitoring time 2 flares were observed the characteristics of which are given in Table II. For each flare following characteristics (Andrews et al. 1969) are given: a) the date and universal time of flare maximum (t_b and t_a, respectively), as well as the total duration of the flare, c) the value of the ratio $(I_f-I_o)/I_o$ corresponding to flare maximum,where I_o is the intensity deflection less sky background of the quiet star and I_f is the total intensity deflection less sky background of the star plus flare, d) the integrated intensity of the flare over its total duration, including pre-flares, if present, $p = \int(I_f-I_o)/I_o dt$,e) the increase of the apparent magnitude of the star at flare maximum $\Delta m(b) = 2.5\log(I_f/I_o)$, where b is the blue magnitude of the star in the instrumental system, f) the standard deviation of random noice fluctuation $\sigma(mag) = 2.5 \log(I_0+\sigma)/I_0$ during the quiet - state phase immediately preceding the beginning of the flare and g) the air mass at flare maximum. The light curves of the observed flares in the b colour are shown in Figs 1,2.

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References:

Andrews, A.D., Chugainov, P.F., Gershberg, R.E. and Oskanian, V.S.: I.B.V.S. No. 326, 1969

Table Ia

Date	Monitoring interval (U.T.)	Total Monitoring Time	σ(U.T.)
1973			
May			
19	21^h19^m - 21^h51^m , 22^h04^m - 22^h17^m , 22^h19^m - 22^h29^m ,		0.01(21^h49^m), 0.01(22^h20^m),
	23 02 - 23 08 , 23 11 - 23 22 , 23 30 - 23 42 ,		0.01(23 20), 0.01(23 31)
	23 46 - 23 54 , 23 59 - 24 00 .	1^h23^m	
20	00 02 - 00 05 , 00 08 - 00 15 , 00 21 - 00 42 ,	31	0.01(00 22)
24	21 32 - 21 39 , 21 40 - 21 51 , 21 54 - 22 04 ,		0.02(21 41), 0.02(22 35),
	22 06 - 22 07 , 22 10 - 22 22 , 22 25 - 22 48 ,		0.01(23 23).
	22 50 - 22 52 , 22 56 - 23 06 , 23 08 - 23 19 ,		
	23 21 - 23 31 , 23 32 - 23 44 , 23 45 - 23 51 ,		
	23 59 - 24 00 .	1 56	
25	00 00 - 00 09 , 00 10 - 00 23 , 00 24 - 00 35 ,		0.01(00 29), 0.01(01 45),
	01 33 - 01 47 .	47	
30	20 51 - 21 04 , 21 08 - 21 38 , 21 40 - 22 17 ,		0.01(20 54), 0.01(21 25),
	22 27 - 22 59 , 23 04 - 23 14 , 23 16 - 23 27 ,		0.01(21 52), 0.01(22 34),
	23 29 - 23 39 , 23 42 - 24 00 .	2 41	0.01(23 31), 0.01(23 54).
31	00 00 - 00 04 , 00 08 - 00 17 , 01 34 - 01 43 .	22	0.01(01 35).
June			
2	22 04 - 22 17 , 22 19 - 22 31 , 22 34 - 22 58 ,		0.01(22 20), 0.01(22 48),
	23 02 - 23 13 , 23 15 - 23 26 , 23 28 - 23 31 ,		0.01(23 16), 0.01(23 54).
	23 40 - 24 00 .	1 34	

Table Ia (Continued)

June			
3	00^h00^m - 00^h03^m, 00^h05^m - 00^h07^m, 01^h11^m - 01^h19^m,		0.01(01^h34^m)
	01 22 - 01 31 , 01 32 - 01 39 .	29^m	
9	19 52 - 20 04 , 20 07 - 20 19 , 20 23 - 20 38 ,		0.011(20 12), 0.010(20 31), 0.008(21 10),
	20 41 - 20 48 , 20 50 - 21 05 , 21 07 - 21 19 ,		0.008(21 42), 0.008(22 19), 0.006(22 35)
	21 28 - 21 35 , 21 37 - 21 49 , 21 51 - 21 59 ,		
	22 03 - 22 14 , 22 17 - 22 27 , 22 31 - 22 39 ,		
	22 40 - 22 47 , 22 49 - 22 58 , 23 54 - 24 00 .	2 31	
10	00 00 - 00 04 , 00 06 - 00 14 , 00 16 - 00 24 ,		0.006(00 08), 0.006(00 48), 0.009(20 03),
	00 29 - 00 35 , 00 37 - 00 45 , 00 47 - 00 54 ,		0.006(20 37), 0.006(20 57), 0.006(21 39),
	19 51 - 20 06 , 20 08 - 20 16 , 20 19 - 20 25 ,		0.006(22 11), 0.006(22 35).
	20 26 - 20 41 , 20 43 - 20 47 , 20 51 - 21 03 ,		
	21 06 - 21 16 , 21 27 - 21 37 , 21 39 - 21 46 ,		
	21 48 - 21 57 , 22 01 - 22 07 , 22 09 - 22 21 ,		
	22 23 - 22 26 , 22 30 - 22 39 , 22 41 - 22 59v.	3 05	
11	00 42 - 00 51 , 00 53 - 01 02 , 01 04 - 01 11 ,		0.006(01 05), 0.007(20 38), 0.008(21 14),
	01 13 - 01 21 , 20 20 - 20 34 , 20 36 - 20 50 ,		0.007(21 48), 0.006(22 24), 0.007(22 55),
	20 53 - 21 07 , 21 10 - 21 24 , 21 28 - 21 40 ,		0.005(23 24).
	21 44 - 21 56 , 22 06 - 22 19 , 22 21 - 22 33 ,		
	22 39 - 22 49 , 22 53 - 23 03 , 23 06 - 23 10 ,		
	23 13 - 23 19 , 23 20 - 23 29 , 23 32 - 23 40 .	3 05	
12	01 22 - 01 30 , 01 33 - 01 42 .	17	0.005(01 28)
13	20 29 - 20 43 , 20 45 - 20 59 , 21 04 - 21 14 ,		0.008(20 48), 0.006(21 11), 0.009(21 53),
	21 16 - 21 23 , 21 25 - 21 29 , 21 32 - 21 46 ,		0.006(22 21), 0.006(22 43), 0.008(23 22),
	21 48 - 22 00 , 22 09 - 22 13 , 22 19 - 22 29 ,		
	22 32 - 22 36 , 22 40 - 22 50 , 22 54 - 23 04 ,		
	23 09 - 23 18 , 23 21 - 23 30 , 23 33 - 23 37 .	2 15	

Table Ia (Continued)

June			
14	01^h06^m - 01^h14^m , 01^h17^m - 01^h24^m , 01^h27^m - 01^h36^m,	24	0.006(01^h29).
19	21 56 - 22 24 , 22 26 - 22 57 .	59	0.010(22 15), 0.010(22 40).
20	00 38 - 01 05 , 01 07 - 01 41 , 21 28 - 21 52 ,		0.006(00 51), 0.009(01 32), 0.008(21 35),
	21 55 - 22 25 , 22 27 - 23 01 .	2 19	0.011(22 21), 0.011(22 31).
21	00 58 - 01 37 , 01 40 - 01 47 , 20 08 - 20 29 ,		0.009(01 10), 0.009(20 16), 0.007(20 49),
	20 32 - 20 59 , 21 01 - 21 29 , 21 37 - 22 05 ,		0.008(21 23), 0.007(22 02), 0.008(22 22).
	22 07 - 22 30 .	2 53	
22	22 43 - 22 52 , 23 45 - 24 00 .	24	0.009(22 47), 0.007(23 57).
23	00 00 - 00 10 , 00 13 - 00 41 , 00 56 - 01 27 ,		0.009(00 25), 0.009(01 20).
	01 30 - 01 38	1 17	
24	20 11 - 20 36 , 20 38 - 21 11 , 21 15 - 21 44 ,		0.010(20 23), 0.011(20 44), 0.012(21 23),
	22 43 - 23 03 .	1 47	0.008(22 56).
25	20 05 - 20 34 , 20 37 - 21 10 , 21 12 - 21 44 ,	1 34	0.011(20 27), 0.009(20 42), 0.009(21 20).
26	21 41 - 22 09 , 22 11 - 22 43 .	1 00	0.008(21 55), 0.009(22 29).
27	20 34 - 21 02 , 21 04 - 21 16 , 21 17 - 21 34 ,		0.006(20 56), 0.007(21 19), 0.007(22 03).
	21 36 - 22 09 .	1 30	
28	20 00 - 20 28 , 20 30 - 21 07 , 21 10 - 21 45 ,		0.008(20 06), 0.010(20 54), 0.011(21 34),
	21 51 - 22 22 .	2 11	0.008(22 12).
29	20 08 - 20 41 , 20 44 - 21 12 , 21 16 - 21 45 ,	1 30	0.008(20 27), 0.007(21 01), 0.007(21 28).
30	19 53 - 20 19 , 20 22 - 20 53 , 20 55 - 21 29 ,		
	21 37 - 21 55 .	1 49	0.010(19 58), 0.006(20 29), 0.008(21 00),
			0.007(21 44).
July			
1	21 46 - 22 05 , 22 07 - 22 14 , 22 16 - 22 49 ,	59	0.012(21 48), 0.007(22 28)
2	20 53 - 21 24 .	31	0.009(20 59).
	Total	42^h03^m	

Table Ib

Date	Monitoring interval (U.T.)						Total Monitoring Time	σ(U.T.)
1974								
July								
6	21^h08^m	$- 21^h36^m$	$, 21^h38^m$	$- 22^h06^m$	$, 22^h08^m$	$- 22^h18^m$,		$0.01(21^h27^m)$, $0.01(21^h46)$,
	23 02	- 23 32	, 23 47	- 24 00 .			1^h49	0.01(23 05), 0.01(23 50).
7	00 00	- 00 18	, 00 21	- 00 44			41	0.01(00 34).
10	20 08	- 20 38	, 20 41	- 21 03	, 21 07	- 21 11 ,		0.01(20 23), 0.01(20 59),
	21 14	- 21 26	, 21 30	- 21 32	, 21 33	- 21 35 ,		0.01(21 19).
	21 39	- 21 48 .					1 21	
11	20 21	- 20 50	, 20 53	- 21 19	, 21 26	- 21 41 ,		0.01(20 31), 0.01(20 57),
	21 44	- 21 55 .					1 21	0.01(21 33).
14	20 42	- 21 07	, 21 09	- 21 48	, 22 13	- 22 28 ,		0.01(20 50), 0.01(21 20),
	22 31	- 22 44	, 23 50	- 24 00 .			1 42	0.01(22 32).
15	00 00	- 00 25	, 00 27	- 01 02	, 22 37	- 23 09 ,		0.01(00 04) , 0.01(00 39),
	23 13	- 23 18	, 23 33	- 23 48	, 23 50	- 34 00 .	2 02	0.01(23 03), 0.01(23 35), 0.01(23 51).
16	00 00	- 00 26	, 00 31	- 00 37	, 20 23	- 20 44 ,		0.01(00 33), 0.01(20 38), 0.01(21 28),
	20 50	- 20 54	, 20 57	- 21 32	, 21 35	- 21 51 ,		0.01(21 37).
	22 00	- 22 07 .					1 55	
17	20 05	- 20 33	, 20 37	- 21 10	, 21 13	- 21 36 ,		0.01(20 11), 0.01(21 03),
	21 38	- 21 41 .					1 27	0.01(21 17).
19	20 22	- 20 53	, 20 56	- 21 14	, 21 18	- 21 24 ,		0.01(20 44), 0.01(20 59),
	21 28	- 21 48	, 21 53	- 21 59 .			1 21	0.01(21 39).
August								
6	20 10	- 20 39	, 20 42	- 21 15	, 21 17	- 21 37 ,		0.005(20 21), 0.004(20 44),
	21 53	- 22 19	, 22 21	- 22 49	, 22 52	- 23 20 ,		0.005(21 19) , 0.005(22 04), 0.008(22 42),
	23 32	- 23 55 ,					3 07	0.007(23 02), 0.008(23 49).

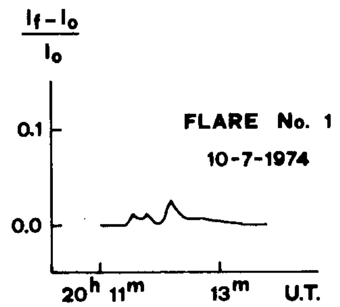
T a b l e Ib (Continued)

August 7	$00^h02^m - 00^h29^m$, $00^h33^m - 01^h00$, $19^h52^m - 20^h25^m$, 21 17 - 21 49 .	1 42	0.008(00 05), 0.007(00 35),0.007(20 17), 0.006(21 21).
	Total	18^h35^m	

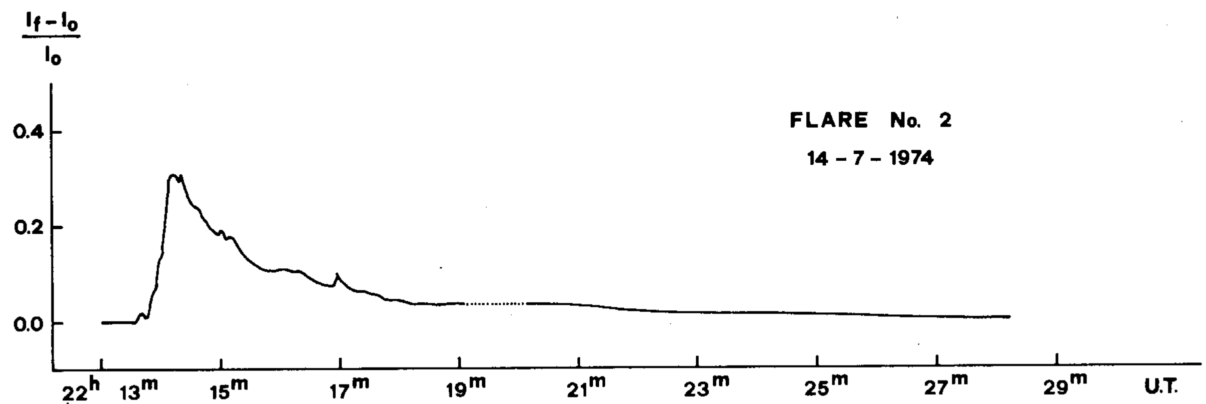
T a b l e II

Characteristics of the Flares Observed

Flare No.	Date 1974 July	U.T. max.	t_b min	t_a min.	Duration min.	$(I_f-I_o)/I_o$ max.	P min.	Δm mag.	σ mag.	Air mass.
1	10	$20^h\ 12^m.2$	0.8	1.3	2.1	0.025	0.012	0.027	0.005	1.08
2	14	22 14.2	0.6	13.3	13.9	0.310	0.720	0.300	0.010	1.04



$\frac{I_f - I_o}{I_o}$
0.1
0.0
FLARE No. 1
10-7-1974
20h 11m
13m
U.T.



$\frac{I_f - I_o}{I_o}$
0.4
0.2
0.0
FLARE No. 2
14 - 7 - 1974
22h 13m
15m
17m
19m
21m
23m
25m
27m
29m
U.T.

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Konkoly Observatory
Budapest
1976 October 4

MINIMA AND THE VISUAL LIGHT CURVE OF THE ECLIPSING BINARY RV PISCIUM

The star RV Psc is an interesting Algol-system ($\alpha_{1900}=1^h14^m06^s$, $\delta_{1900}= 30^o40'$, $11^m.3$ - $12^m.0$, F8), but not a classical Algolid, with the very short period P = $13^h17^m45^s$ and both minima are almost equal. No period changes were observed (Ahnert 1975). Maybe the components of RV Psc are subdwarfs (luminosity class VI) ?

This paper contains the results of visual observations of RV Psc made in the year 1936 at the island Hios (Greece) using the 203 mm Expedition refractor. The observations were collected by Szafraniec (1962), but not elaborated as yet.

The following comparison stars were used:

a) $\alpha_{1900}= 1^h13^m41^s$, $\delta_{1900}= +30^o46'.6$, $m_V = 11^m.55$
$\alpha_{1900}= 1\ 13\ 46$, $\delta_{1900}= +30\ 42.5$, $m_V = 11.90$.

Table 1 gives primary and secondary minima determined by the tracing-paper method. The consecutive columns contain heliocentric time of minimum, kind of minimum, limit of error, number of points n and O - C.

Table 1

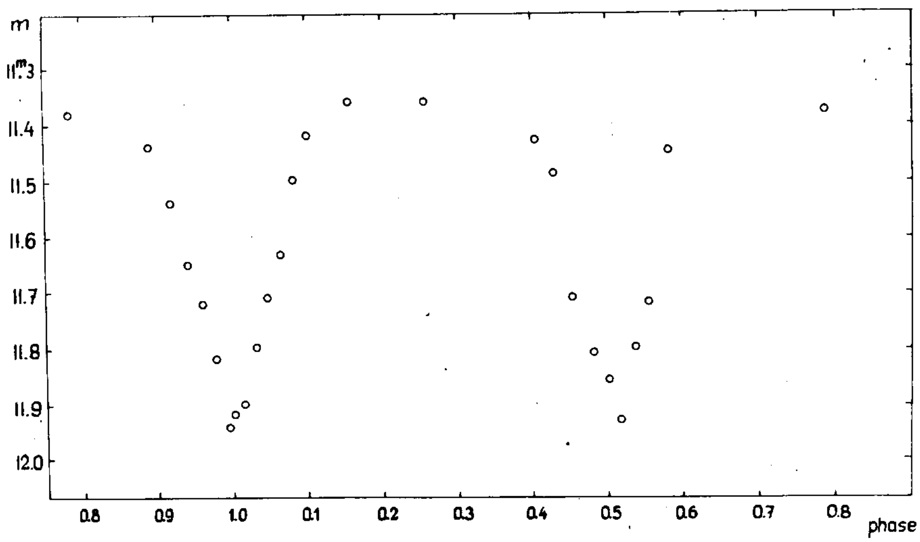
JD hel.	Min.	Lim.error	n	O-C
$2428347^d.5065$	I	$\pm0^d.0015$	18	$+0^d.0017$
2428362.4620	I	.0015	33	-0.0006
2428367.4485	I	.0015	27	+0.0000
2428372.4405	I	.0020	13	+0.0061
2428390.4405	II	.0015	20	+0.0014
2428391.5500	II	.0020	11	+0.0029

The values of O-C were obtained according to the elements given by Ahnert (1975):

$$\left.\begin{array}{l}\text{Min. I JD hel.} = 2424381^d.480\\ \text{Min.II JD hel.} = 2424381.757\end{array}\right\} +0^d.55399145\cdot E.$$

The Figure presents the mean visual light curve of the eclipsing binary RV Psc.

Further observations, spectroscopic and photometric, are needed to explain the physical nature of this eclipsing system.



Mean light curve of RV Piscium

T.Z. DWORAK
K. KORDYLEWSKI

References:
Ahnert, P. 1975, IBVS, No.978
Szafraniec, R. 1962, Acta Astr.Suppl. 5, 719

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Number 1183

Konkoly Observatory
Budapest
1976 October 4

NEW PHOTOELECTRIC OBSERVATIONS OF THE DELTA SCUTI STAR HR 4684

HR 4684 belongs to the Coma Cluster and this was the first Delta Scuti star to be discovered in a galactic cluster (Breger and Sanwal, Astrophys.Lett. 1,103,1968). J.E. Elliot (Astron.J. 79,1082,1974) measured the star for few nights during 1970 and he determined the period $P=0\overset{d}{.}0551$.

We observed HR 4684 at the Merate Observatory through V filter during two series of consecutive nights: JD 2442862. - 866. and JD 2442912. - 916. The light curves related to the last series are plotted in Figs. 1-5.

The shape and the amplitude of the light curves are different from cycle to cycle. We tried to represent our maxima and minima using the period suggested by Elliot, but with no success. On the contrary it is possible to reproduce the minima of the nights JD 42915.- 916. using $P=0\overset{d}{.}0713$, but this period is not useful for the previous nights.

We belive that a periodogram analysis is necessary and we have intention of doing it in the immediate future.

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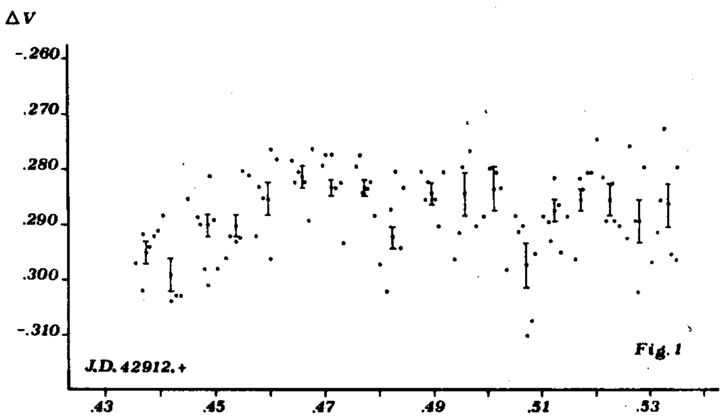
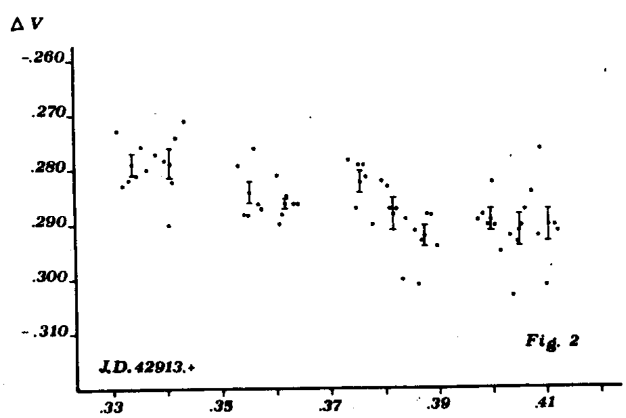

ΔV
-.260
.270
.280
.290
.300
-.310
J.D. 42912.+
Fig. 1
.43
.45
.47
.49
.51
.53


ΔV
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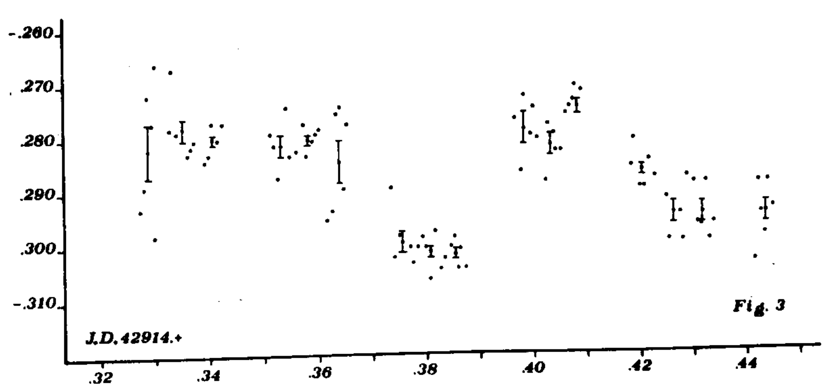
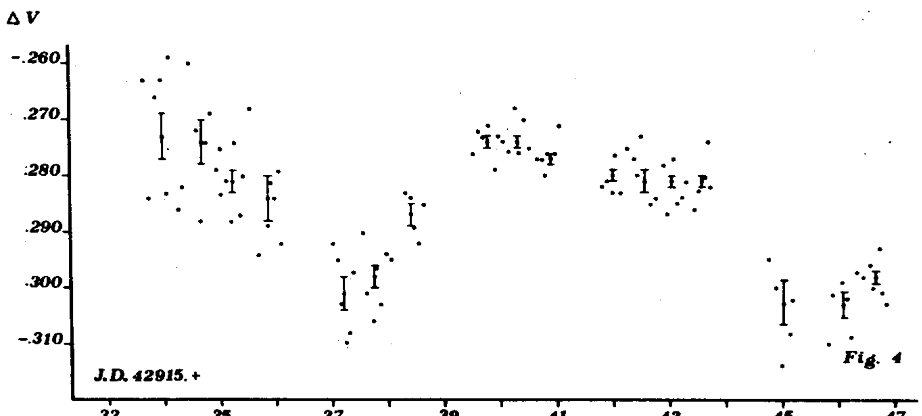
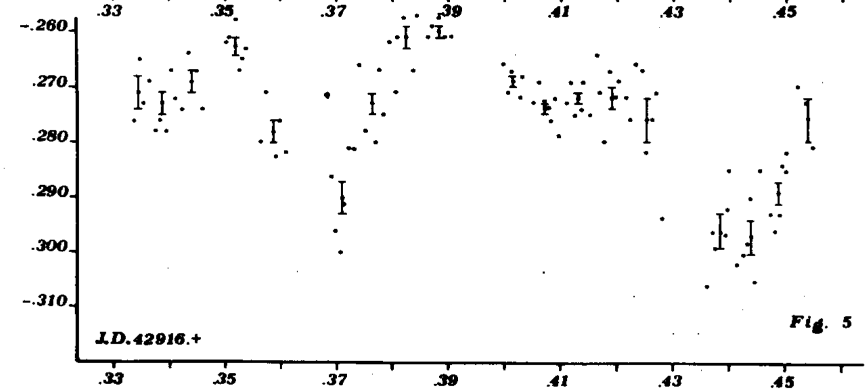
.270
.280
.290
.300
-.310
J.D. 42913.+
Fig. 2
.33
.35
.37
.39
.41


-.260
.270
.280
.290
.300
-.310
J.D. 42914.+
Fig. 3
.32
.34
.36
.38
.40
.42
.44


Δ V
-.260
.270
.280
.290
.300
-.310
J.D. 42915.+
.33
.35
.37
.39
.41
.43
.45
.47
Fig. 4


-.260
.270
.280
.290
.300
-.310
J.D. 42916.+
.33
.35
.37
.39
.41
.43
.45
Fig. 5

COMMISSION 27 OF THE I. A. U.
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Number 1184

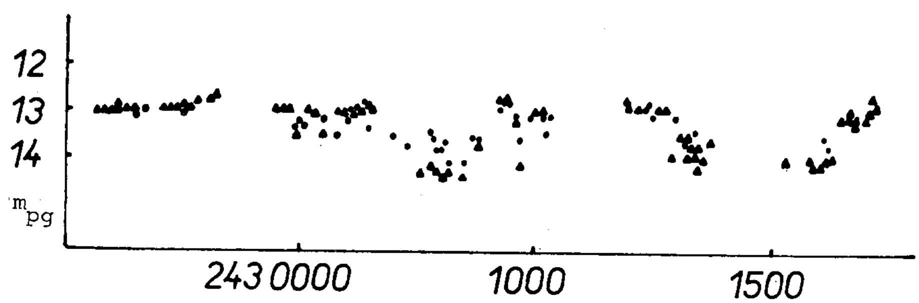
Konkoly Observatory
Budapest
1976 October 5

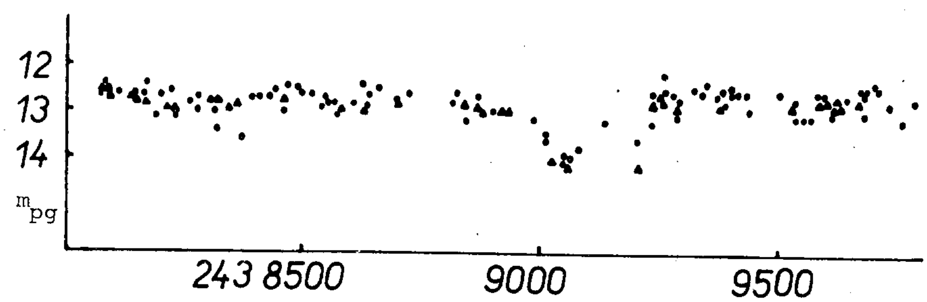
ACTIVE AND INACTIVE STATE OF AM Her = 3U 1809+50

The preliminary results of the observations on 700 Sonneberg archiv plates from years 1928-1976 show that the variable star AM Her, the optical candidate for the high galactic latitude X--ray source 3U 1809+50, exhibits two different states in its long-time light curve. During the first of them (we call it active state) is AM Her approximately $m_{pg} \approx 12\overset{m}{.}8$ bright and shows probably small amplitude light variations of $0\overset{m}{.}3$ in the time scale of approximately 200 days or more. During the inactive state AM Her is roughly $m_{pg} \approx 14\overset{m}{.}2$ faint. The inactive state was found in the following intervals:
J.D. 242 7150-7310, J.D. 242 8200-8450, J.D. 243 0700-0900, J.D. 243 1300-1620, J.D. 243 2800-3500, J.D. 243 9020-9230 and J.D. 244 1570-1700.

The Figures show two selected parts of the long-time variations of AM Her on our plates.

The existence of two different states of AM Her is similar to the other high latitude X-ray source HZ Her=Her X-1.Probably these variations are caused by a mechanism like that in the HZ Her system, i.e., the X ray heating and reflection effect. The short-time variations (eclipsing light curve) with very broad secondary minimum as compared with the primary one of AM Her (Cowley et al., IAUC 2984) are similar to the HZ Her inactive state light eclipsing variations (Wenzel and Hudec, IBVS No.1082), too. Thus, the optical behaviour of AM Her supports strong evidence to the identification AM Her=X-ray source 3U 1809+50. However, the orbital period of AM Her system is only 186 min.(Cowley et al.,IAUC 2984) as compared with HZ Her (1.700175 day; Wenzel and Hudec IBVS No.1082) and so the light curve obtained from the plates (expos. from 30 to 180 minutes) cannot show the detailed short-time eclipsing variations, but only the mean brightness with smaller variations.





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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
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PERIODIC SUPERHUMPS ON WX HYDRI

In I.B.V.S. No. 864 we drew attention to the occurence of "humps" on the supermaximum outburst light-curve of the dwarf nova VW Hydri. These "superhumps" were displaced in phase from the normal humps which occur at minimum and appeared variable from cycle to cycle. The normal humps provided direct data for determination of the orbital period of the system.

Vogt (1974) and Warner (1975a) subsequently analysed the observations to show the superhumps were repetitive with a period approximately 3% greater than the orbital period. Warner(1975b) has drawn attention to a similar phenomenon on V436 Centauri.We report here the observation of superhumps on another dwarf nova, WX Hydri. We deduce a preliminary orbital period for the system from the superhump period and from a few observations when the star was at minimum.

WX Hydri was observed photo-electrically at Auckland Observatory on 1976 September 21 and September 22 with the Zeiss 500 mm Cassegrain telescope and an EMI 9502 photomultiplier.The observations cover an interval of six hours on September 21 and just under an hour on September 22 (when cloud cut short the programme). The star was monitored in white light but five sets of three colour UBV observations were obtained during the runs. The peak V magnitude of WX Hydri (V~11.35) indicated that a supermaximum was in progress.

The observations are presented in Figure 1. These show three peaks on the first night and part of a peak on the following night. From these we have derived a period of 1 hour 52.7 minutes (0.0783 days). The peaks are similar in nature to those on VW Hydri.

We have also measured WX Hydri in December 1973 when it was not in outburst. The light-curve showed quasi-periodic variations with indications of shallow eclipse-like features having a period of 0.14989 days. The star at V~14.7 is near our observing limit and so no further observations were obtained at minimum in the following two seasons. A period of half of this value, i.e. 0.0749 days, is ~4% less than the superhump period, compared with the 3% for VW Hydri, and appears probable as the orbital period of the system.

There are some peculiar indentations in the light-curve on 1976 September 21 which resemble shallow partial eclipses. These, together with the behaviour at minimum and the amplitude of the superhumps, indicate that WX Hydri may have a high inclination. Should these indentations be partial obscurations of the source of the superhumps further observations of the feature may provide a means of determining the nature of the superhump and its location in the system.

We acknowledge with thanks to the use of the Auckland Observatory telescope and photoelectric accessories. We would also thank Graham Blow for the use of observing time at short notice.

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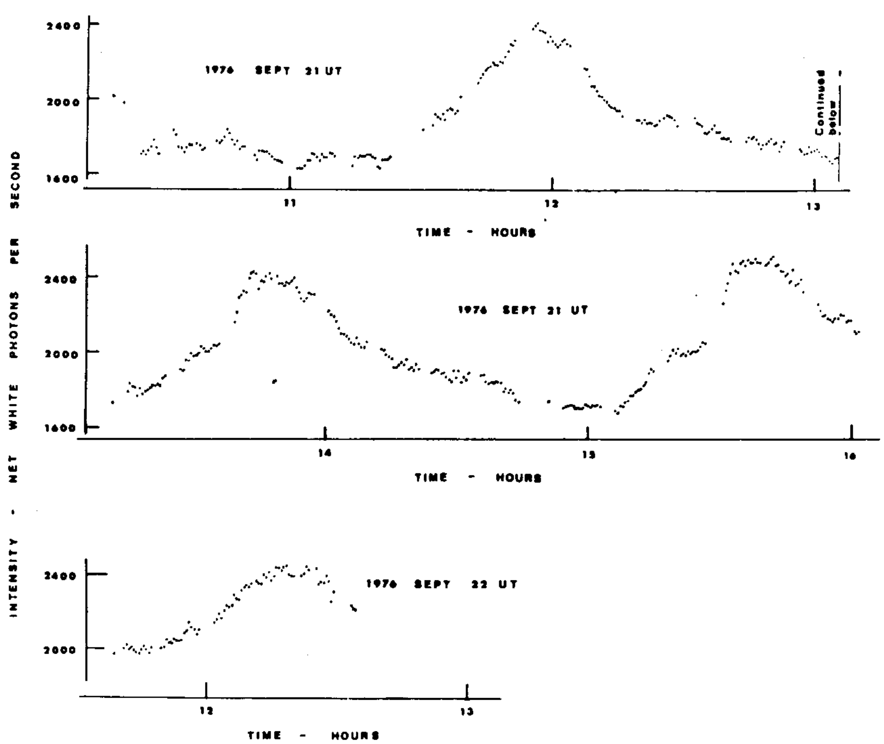

FIGURE 1 SUPERBUMPS ON WX HYDRI

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Budapest
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ULTRAVIOLET MONITORING OF BY Dra STARS

The BY Dra stars AU Mic, AT Mic, CC Eri, HD216803 and HDE319139 were monitored photoelectrically in the period August--September 1974, in order to study their flare activity.The observations were carried out at Cerro Tololo Interamerican Observatory, using a 60 cm telescope, in the U-band. The data were reduced following the precepts of Kunkel (1973),and are presented in Tables 1 to 9. A detailed analysis will be published elsewhere.

Tables 1 to 5 give the coverage in universal time. All breaks greater than 1 minute were considered.

The flare data are listed in Tables 6 to 9. The columns contain, respectively: Julian Date of flare maximum; secant of zenith distance; U-magnitude of peak light, after subtraction of quiescent component; flare durations T_q in minutes measured at q=0.5, 0.2 and 0.1 peak light. The meaning of symbols in column labelled "obs" is as follows:

D - double peak
C - complex light curve
L - peak intensity close to Kunkel's weak-event threshold
I - incomplete record. Usually the peak was lost during a sky measure.

The symbol "u" following a quantity means that it was obtained with a precision less than that given below:

JD - 0.001 day (about 1 min.)
U - 0.1 magnitude
T_q - 20 percent.

We should note that HDE319139, a dK5e star (Bidelman 1954), was formerly not known to be a flare star, but was included in the program due to its BY Dra nature. The star HD216803 (TW PsA) showed quiescent variability, but no flares were detected on it.

Table 1

JD 2442000.+	Coverage AU Mic (U.T.)
270.5	$04^{h}14^{m}.3$ - $06^{h}17^{m}.3$
271.5	03 04.5 - 04 51.0
272.5	01 56.5 - 03 54.0
	04 51.5 - 06 06.7
273.5	04 45.0 - 07 01.0
274.5	03 14.5 - 03 47.5
	04 48.0 - 06 16.0
275.5	02 19.7 - 03 00.0
	03 09.5 - 04 20.0
	05 03.0 - 06 16.0
277.5	02 09.5 - 04 38.0
278.5	02 52.5 - 05 21.3
279.5	03 00.7 - 03 29.0
280.5	02 47.5 - 04 21.5
283.5	$02^{h}12^{m}.0$ - $02^{h}38^{m}.3$
	03 11.0 - 03 26.0
	04 05.5 - 04 30.0
285.5	01 53.0 - 03 25.5
	03 44.2 - 05 25.0
294.5	04 10.0 - 05 16.0
295.5	02 28.5 - 02 55.7
	02 58.0 - 03 28.5
296.5	02 57.0 - 04 26.0
297.5	05 35.0 - 06 05.5
304.5	03 17.0 - 04 04.5
311.5	03 11.5 - 04 31.5
316.5	03 30.5 - 04 04.5
319.5	03 48.0 - 04 33.0

Table 2

JD 2442000.+	Coverage HDE319139 (U.T.)
270.5	$01^{h}19^{m}.0$ - $02^{h}47^{m}.3$
272.5	00 30.5 - 01 20.7
273.5	00 39.5 - 01 14.0
	01 17.5 - 02 12.5
274.5	00 14.5 - 02 06.0
	02 18.5 - 02 25.7
275.5	00 00.0 - 00 27.2
	00 33.0 - 01 20.5
277.5	00 25.8 - 01 27.0
278.5	00 10.0 - 01 50.2
279.5	00 09.0 - 01 25.0
280.5	00 07.5 - 01 52.5
282.5	23 52.5 - 24 00.0
283.5	00 00.0 - 01 06.2
284.5	$23^{h}50^{m}.0$ - $24^{h}00^{m}.0$
285.5	00 00.0 - 00 30.5
	00 33.0 - 01 12.5
294.5	02 38.5 - 02 48.0
295.5	00 38.5 - 01 31.2
296.5	01 39.0 - 02 31.0
297.5	01 00.0 - 02 06.2
304.5	01 02.0 - 02 31.0
316.5	01 43.5 - 01 59.0
	02 01.5 - 02 51.2
319.5	00 37.3 - 03 10.5
320.5	01 47.0 - 02 35.0
	02 40.3 - 03 20.0

Table 3

JD 2442000.+	Coverage CC Eri (U.T.)
270.5	$09^{h}13^{m}.0$ - $10^{h}03^{m}.2$
271.5	07 55.2 - 09 28.5
272.5	08 31.2 - 09 28.3
	09 45.0 - 10 12.0
273.5	08 11.0 - 09 28.7
274.5	08 06.5 - 09 34.0
	09 54.0 - 10 07.0
275.5	08 36.0 - 09 32.0
	09 46.5 - 10 00.0
277.5	07 39.3 - 09 28.0
278.5	07 33.7 - 09 37.1
	09 51.7 - 10 05.5
280.5	08 16.5 - 08 29.0
	08 41.0 - 09 49.0
280.5	$09^{h}54^{m}.5$ - $10^{h}02^{m}.8$
294.5	07 10.6 - 09 01.5
	09 21.0 - 09 49.3
295.5	05 50.0 - 06 12.5
	06 15.0 - 06 39.2
296.5	07 38.5 - 08 19.0
297.5	07 28.2 - 07 51.8
	07 54.5 - 08 15.0
304.5	06 40.0 - 07 53.0
316.5	06 18.0 - 08 07.3
318.5	05 10.0 - 06 15.5
319.5	05 57.0 - 06 59.5
320.5	05 50.5 - 06 29.2

Table 4

JD 2442000.+	Coverage HD216803 (U.T.)	JD 2442000.+	Coverage HD216803 (U.T.)
270.5	$06^h41^m.5$ - $08^h27^m.8$	278.5	$06^h00^m.5$ - $07^h29^m.2$
271.5	05 52.0 - 07 39.0	279.5	05 41.5 - 06 12.0
272.5	06 43.0 - 08 16.8	280.5	06 38.5 - 07 39.0
273.5	07 21.0 - 07 56.5	285.5	06 15.0 - 07 29.5
274.5	06 47.0 - 07 55.5	294.5	05 50.0 - 06 27.0
275.5	06 34.0 - 07 55.0	297.5	06 36.0 - 06 51.0
277.5	06 27.3 - 07 31.0		

Table 5

JD 2442000.+	Coverage AT Mic (U.T.)
295.5	$03^h47^m.0$ - $04^h30^m.5$
296.5	04 38.0 - 06 41.2
297.5	02 46.7 - 05 03.5

Table 6

Flares AU Mic

JD 2442000.+	secz	U	$T_{0.5}$	$T_{0.2}$	$T_{0.1}$	Obs.
271.643	1.01	14.61u	21.0u			D
271.683	1.00	13.25	3.8	9.2u		
272.584	1.11	14.16	1.0u			
272.608u	1.06	13.67	3.4	13.0		D
272.704	1.02	9.90	> 4.0	> 30.0	62.0	I
272.711	1.04	13.98	0.4u			
275.600	1.05	13.93u	2.0u			
275.634	1.01	11.33	0.8	6.7	13.4	
275.658u	1.00	13.45	10.7			D
277.605u	1.04	13.06	16.3	28.5		C,I
278.665u	1.00	14.80	3.8u			
278.697	1.03	13.32	5.3	10.9		
278.711	1.05	11.41	1.5	4.4	13.3u	
280.639	1.00	12.17	1.3	21.2	28.0	C
283.599	1.02	14.50u	6.4			
285.632u	1.00	13.90	1.7	7.8u		
285.707	1.09	12.83	0.6u	2.8		
294.632	1.07	14.40u	> 3.0			I
294.713	1.19	14.16u	1.0			L
296.624	1.01	12.30	> 16.0			I
296.658u	1.05	14.64u	3.3			L
296.674u	1.08	13.36	8.0			C

Table 7

Flares HDE319139

JD 2442000.+	secz	U	$T_{0.5}$	$T_{0.2}$	$T_{0.1}$	Obs.
274.549	1.00	11.46	10.1	43.1	72.4	
277.544u	1.00	15.56u	7.0u			
285.493	1.02	13.50	> 0.8	> 4.5	> 8.0	I
295.543u	1.03	15.40u	2.7u			L
297.549u	1.12	15.20u	7.0u			
297.542	1.03	15.67u	> 2.0			I
319.579	1.39	15.14	10.0			

Table 8

Flares CC Eri

JD 2442000.+	secz	U	$T_{0.5}$	$T_{0.2}$	$T_{0.1}$	Obs.
271.838	1.11	13.82	1.5	12.7	14.6	I
272.908	1.03	11.24	>4.0	> 25.0		I
274.866	1.05	13.38	0.8u			
275.876u	1.04	13.60	4.8u			
278.819u	1.11	14.08	8.2			I
278.843	1.06	14.10	5.7	20.0u		D,C
294.809u	1.05	14.73u	1.5			L
294.846	1.03	14.60u	1.8			
296.827	1.03	10.51	1.2	19.5	29.2u	C
316.777	1.03	15.00u	7.1u			
318.717	1.09	13.33	0.5			L
319.783	1.03	14.10	5.0	11.3		D

Table 9

Flares AT Mic

JD 2442000.+	secz	U	$T_{0.5}$	$T_{0.2}$	$T_{0.1}$	Obs.
295.670	1.07	13.02	0.3u	0.5	1.7u	
295.675	1.08	13.52	1.0	3.5		
296.694	1.14	14.68	4.9u			
296.706	1.18	13.98	1.1u	14.6u		D
296.755	1.47	14.84u	1.2			
296.766	1.57	14.82u	1.3			

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COMMISSION 27 OF THE I. A. U.
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Konkoly Observatory
Budapest
1976 October 13

ECLIPSE TIMINGS OF CATACLYSMIC VARIABLES

The following heliocentric times of eclipse of the cataclysmic variable U Gem and the similar but non eruptive variable UX UMa have been obtained from observations made at Kitt Peak National Observatory.

U Gem

Color	HJD	(O-C)	Eclipse Depth (mag)	Eclipse Width (day)
Red	2442789.8040	0.0076	0.38	0.0115
Blue	2442789.8042	0.0078	0.34	0.0106
Red	2442880.7336	0.0075	-	0.0114
Blue	2442880.7338	0.0077	-	0.0116

Eclipse parameters are those given by Krzeminski (Ap.J. 142, 1051, 1965). Colors are as described by Arnold, Berg and Duthie (Ap.J. 206, 790, 1976).

UX UMa

Color	Min.Light HJD	(O - C)
white	2442420.9944	-0.0014
white	2442541.7505	-0.0014
white	2442791.9174	-0.0004
white	2442792.9003	-0.0009

(O-C) values are with respect to the elements given by Mandel (Perem. Zvezdy 15, 474, 1965) and lend support to his 29.02 year periodicity of the (O-C) residuals.

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HD 174237 (MWC 608)

Recently Merlin (1975) disclosed that the bright B emission star HD 174237 (α: $18^h44^m.4$, δ:+52°53',1900) displays variations in U,B,V larger than 0.1 mag. These changes were reported to have no true periodicity, only 7-12 days cycle. In the past radial velocities of this star were measured by Plaskett et al. (1920). The amplitude of the radial velocity was about 95 km/sec, but no period has been established. Lacoarret (1965) studied the hydrogen emission profiles of MWC 608. She described two types of variations: long term (3 years) and short term (5-7 days). Merlin (1975) pointed out that the photometric changes in U,B,V might be correlated to short term line profile variations.

HD 174237 was observed with the 2 m telescope of the Ondřejov Observatory during May - October 1975 and April-July 1976. About 30 coudé spectrograms (8 and 16 Å/mm) were obtained. The spectra have been taken on IIaOb emulsion and cover the wavelength region from 3600 to 4970 Å.

Radial velocities of seven helium lines (3819.6, 4009.3, 4026.2, 4143.8, 4387.9, 4471.5, and 4921.9 Å) were measured on 28 plates taken within the interval of 400 days. Velocities derived from the position of the He I lines were checked by a program for finding periods. The best fit is 6.691 days. The observations are assembled in a velocity/phase diagram in Figure 1.

The periodicity of the helium radial velocities strongly supports the idea that Be star MWC 608 is a spectroscopic binary.

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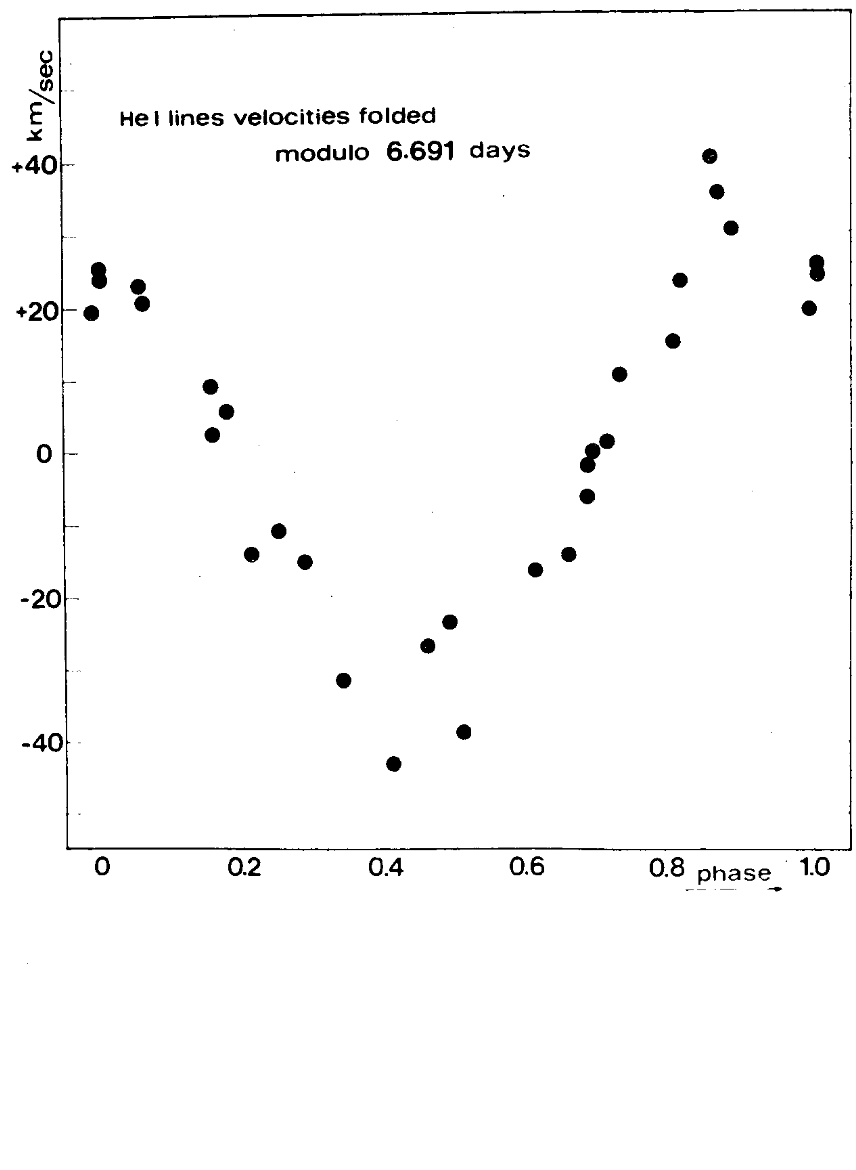
He I lines velocities folded
modulo 6.691 days
km/sec
+40
+20
0
-20
-40
0
0.2
0.4
0.6
0.8
phase
1.0

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Budapest
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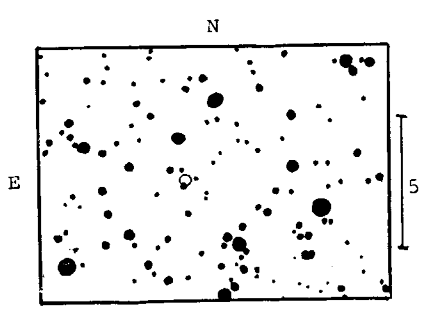
A NEW EMISSION OBJECT

A new emission object (RA = $19^h39^m.8$, Decl.=+16°38' ; 1950) was discovered on the objective-prism plate taken by B. Balázs O.D. Dokuchaeva and Zs. Vizi with the 60/90/180 cm Schmidt-camera at the Piszkéstető Observatory (Hungary).

The object shows remarkable continuous and emission-line spectra. The emission Hα - Hζ, [OIII] N_1,N_2, probably HeI 5876, HeII 4686 and others seem to be present.

The cursory examination of a series of direct photographs (1898-1976) of Sternberg State Astronomical Institute (Moscow) showed great light changes. The star was invisible to April 1975 (limit of plates from 13^m to 17^m). From 4 April to September 1975 the magnitude of the object rose from 16^m to 11^m. From September 1975 to July 1976 the magnitude varied between 11^m-12^m. The Palomar Sky Survey gave about seventeenth magnitude (O-chart) and probably remarkable red colour for 1950.

The object may be a slow Nova or object similar to variable stars V 1016 and V 1329 Cyg.



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Konkoly Observatory
Budapest
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PHOTOGRAPHIC MINIMA OF ECLIPSING STARS

SX Aur	Min.= J.D. 244 2841.455 (1)	O-C = $+0\overset{d}{.}022$	n = 18
WY Cnc	2839.4605(2)	O-C = +0.0005	13
		$O-C_A$= +0.0005	
EG Cep	2955.475	O-C = +0.023	7
		$O-C_A$= +0.008	
	2961.462	O-C = +0.019	10
		$O-C_A$= +0.004	
	3016.470	O-C = +0.021	10
		$O-C_A$= +0.005	
V477 Cyg	3013.415	O-C = +0.009	11
BS Dra	2963.456	O-C = +0.004	7
CM Lac	2954.491	O-C = +0.006	13
UV Leo	2839.352	O-C = +0.012	11
		$O-C_A$= 0.000	
AP Leo	2871.408	O-C = -0.007	13
TZ Lyr	2922.420 (3)	O-C = +0.024	18
		$O-C_A$= +0.012	
	2960.489	O-C = +0.018	13
		$O-C_A$= +0.006	
U Peg	2714.309	O-C = -0.001	11
		$O-C_A$= +0.009	
	3012.445	O-C = -0.004	12
		$O-C_A$= +0.007	
	3015.435	O-C = -0.012	12
		$O-C_A$= -0.001	
RU UMi	2924.412	O-C = +0.003	9
BU Vul	2962.473	O-C = +0.013	9
		$O-C_A$= +0.007	

C has been computed with the elements in Rocznik 1976, C_A has been computed with the revised elements in MVS vol.6 and 7.
(1) from observations J.D. 42839 and 841, (2) from J.D. 42839 and 859, (3) from J.D. 42922 and 951.

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THE BUMP IN THE LIGHT CURVE OF VARIABLE 1 IN M13

Pike and Meston (IBVS No. 1177, 1976) report that they have examined a series of V plates of the globular cluster of M13 and found that Variable 1 of the cluster shows a bump on the rising branch of the light curve. They conclude, however, that this feature is not the same as the bump that Osborn and Rosenzweig (IBVS No.1126, 1976) suggested was present. In fact, these two bumps are identical. Osborn and Rosenzweig's bump was found to occur at phase 0.8 after maximum light, that is on the _rising_ branch of the light curve at phase 0.2 before maximum. Using Stobie's (Observatory **93**, 111, 1973) equation (1) and Pike and Meston's derived value for the radius of M13 Variable 1 it is easy to show that their bump occurs at $\varphi_V = 1.49$, which is equivalent to $\varphi_\ell = 0.3$ on the light curve adopting Stobie's relation that $\varphi_V = \varphi_\ell + 0.2$. That this is on the rising branch of the light curve implies that their phases are referred to minimum, rather than maximum light as in the case of Osborn and Rosenzweig. Thus, their bump also occurs about phase 0.2 before maximum and the differences in the derived masses and radii are therefore just due to the 0.5 difference in the phase systems.

This author found Stobie's explanation of how the phase should be determined somewhat confusing and the more common reference to the maximum was adopted. However, comparison of Stobie's listed values of φ_ℓ with the published light curves for the respective stars shows his equations are for phases referred to minimum and hence Pike and Meston's results for the mass and radius should be preferred.

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MINIMA AND PERIOD OF THE ECLIPSING BINARY VW PEGASI

The star VW Peg was discovered by Williams (1914) who found this star to be an Algol-system with the period $P=5\overset{d}{.}26792$. Maggini (1916) derived the elements:

$$\text{Min JD hel} = 2420777\overset{d}{.}128 + 2\overset{d}{.}642758 \cdot E,$$

but later observations did not confirm them. Zinner (1922) suggested that VW Peg is rather a β-Lyrae-system.

VW Peg was observed at the Cracow Observatory and at the island Hios (Greece) in the years 1930-1950. These observations were collected by Szafraniec (1962), but not elaborated as yet.

The list below contains four minima obtained by Williams (1914), one minimum given by Maggini (1916) and four minima determined from Cracow Observations of Variable Stars (Szafraniec 1962). The columns contain: heliocentric time of minimum, $(O-C)^{I}$, $(O-C)^{II}$, name of observer and references.

JD hel	$(O-C)^{I}$	$(O-C)^{II}$	Observer	References
2415729$\overset{d}{.}$459	$-0\overset{d}{.}006$	$-0\overset{d}{.}007$	Williams	Williams(1914)
2416635.541	-0.008	-0.006	Williams	Williams(1914)
2417478.444	+0.031	+0.030	Williams	Williams(1914)
2417815.560	0.000	0.000	Williams	Williams(1914)
2420777.128	-0.171	-0.170	Maggini	Maggini (1916)
2426307.473	+0.032	+0.036	Kordylewski	this paper
2426307.475	+0.034	+0.038	Kordylewska	this paper
2426650.363	-0.077		Kordylewski	this paper
2428372.515	+0.051	+0.056	Kordylewski	this paper

The values of $(O-C)^{I}$ were obtained according to the following elements:

$$\text{Min JD hel} = 2417815\overset{d}{.}560 + 1\overset{d}{.}170648 \cdot E$$

and the values of $(O-C)^{II}$ were obtained according to the alternative elements:

$$\text{Min JD hel} = 2417815\overset{d}{.}560 + 2\overset{d}{.}341295 \cdot E.$$

In case of the latter elements the time of minimum JD 2426650.363 refers to the secondary minimum and its $(O-C)^{II} = - 0\overset{d}{.}073$.

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COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 1193

Konkoly Observatory
Budapest
1976 October 25

PROGRAMME OF COOPERATIVE FLARE STAR OBSERVATIONS FOR 1976

The Working Group on Flare Stars after consultation with the Nuffield Radio Astronomy Laboratories, University of Manchester announces the following programme of cooperative optical and radio observations for the period 18 November to 1 December inclusive:

UV Ceti	$18^h\ 00^m$	to	$23^h\ 30^m$	UT
YZ CMi	$23^h\ 30^m$	to	$06^h\ 00^m$	UT

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THE LIGHT VARIATIONS OF THE Ap STAR HD 134793

The magnetic field of the Ap star 134793 was found to be of moderate intensity by Babcock (1958), who also put in evidence magnetic polarity reversals and large spectral changes in the Eu II and Sr II lines into a period of the order of two days. Spectroscopic observations by Bonsack (1974) give evidence of large variations in the line intensities of Ca II, Si II, Mg II and Eu II.

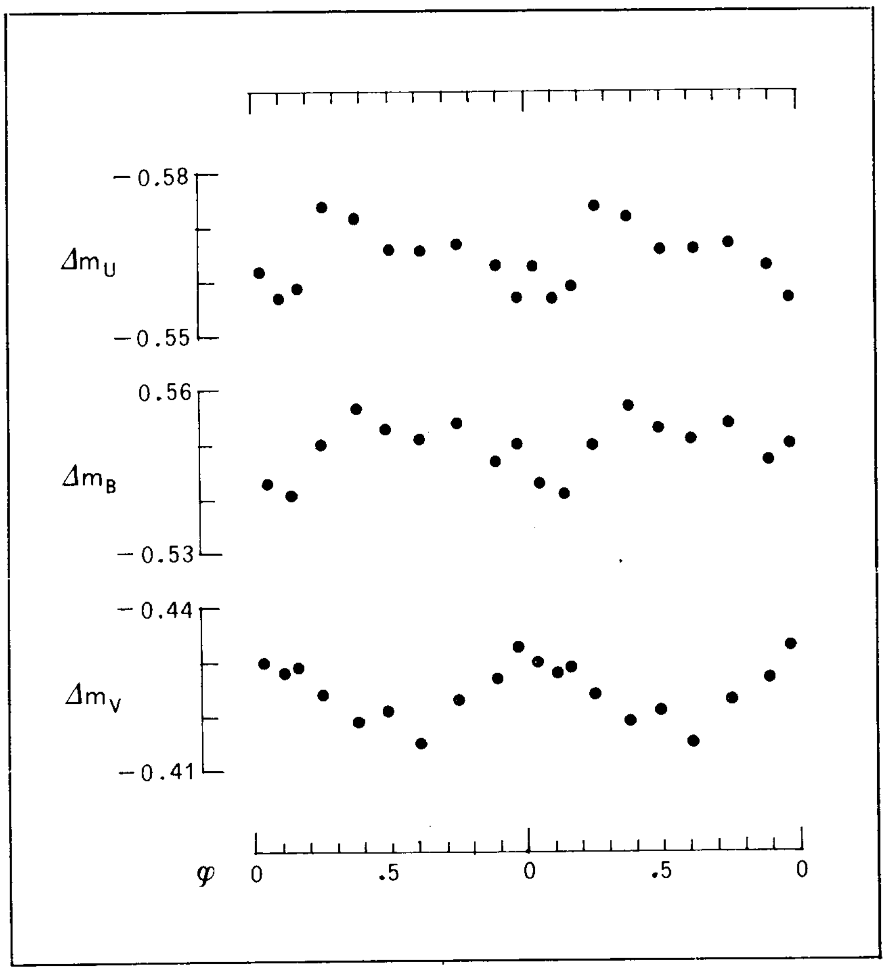
The V magnitude and the colours of this star have been determined by Abt and Golson (1962). A period of 2.7806 days has been determined by Maitzen (1976) from his photoelectric observations.

Photoelectric observations of HD 134793 have been carried out at the 91 cm telescope of the Catania Astrophysical Observatory from 1970 to 1973 in our natural system (λ^U_{eq}= 3500 Å ± 300; λ^B_{eq}= 4370 ± 450; λ^V_{eq}= 5440 ± 300) obtaining 95 measurements in U, 89 in B and 83 in V. The magnitude differences HD 134793 - HD 134827 versus the phase computed by the elements:

$$\text{JD (V light max)} = 244\ 1060^{d}.5 \pm 2^{d}.78 \cdot E$$

are plotted in the Figure. Each point represents the mean value of an average number of eight single measurements. It is remarkable that the V variation goes in opposition of phase with respect to the U and B ones.

The observations by Bonsack (1974) seem to agree with the above value of the period but more spectroscopic and magnetic observations are needed to determine the behaviour of the line intensity variations and to establish their phase relation with the magnetic field and light variations.



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Budapest
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V 1057 CYGNI

Photographic observations of V 1057 Cygni with the Uppsala-Kvistaberg Schmidt telescope have given the following magnitudes (with probable errors about ±0.1 mag.):

	V	B	U
1976-09-20	10.55	12.15	-
1976-09-28	10.65	12.2	13.3

Considering the known rapid fluctuations of one or two tenths of a magnitude, these values do not differ significantly from those reported one year ago (Welin, IBVS 1057, 1975). The rate of brightness decrease must now be definitely less than 0.05 mag. per 100 days, and it seems likely that the decline has stopped altogether.

Spectra of V1057 Cygni have been obtained in August, 1976, with the 1.5 m telescope of l'Observatoire de Haute Provence, equipped with the PEDISCOU spectrograph plus 2-stage RCA image tube (reciprocal dispersion about 100 Å/mm). These spectra show a rather strong G-band, which together with, i.a., Ca I 4227 Å indicates a spectral type of about G0. The hydrogen lines are, however, too strong for this type. Due to the low resolution of these image tube plates no conclusive radial velocities could be measured. The hydrogen and calcium (neutral and ionized) absorption lines are generally shifted about 2 Å towards shorter wavelengths. The K-line has an emission component, apparently with only a small net radial velocity, situated to the longward side of the absorption line. That this emission line can be seen at all suggests that it has grown stronger over the last three years - it was about as visible on a 20 Å/mm spectrum taken in August 1973 at Haute Provence.

In conclusion, V 1057 Cygni has now developed a mixed spectrum similar to that of FU Orionis (Herbig, Vistas in Astronomy, Vol. 8, p. 109, 1966), with a relatively cool, expanding shell surrounding the star. The rise of K-line emission also had its counterpart in the history of FU Orionis.

The allotment of telescope time at l'Observatoire de Haute-Provence is gratefully acknowledged, as is a travel grant from the Swedish Natural Science Research Council. I would also like to thank Prof. T. Oja and Mr. A. Kinnander for taking the Schmidt plates.

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HD 201416 = BD +48^{o} 3289 : A NEW VARIABLE IN CYGNUS

HD 201416 was used as one of the comparison stars in the course of photoelectric observations of Nova Cygni 1975 with the 60 cm reflector of the Loiano Astronomical Station (Cacciari et al. 1976). The observations were made on five nights during a period ranging from October 1975 to June 1976.

Having as comparison stars HD 201612 and HD 201599, this star shows small variations in yellow light with a mean amplitude of about 0.02 magnitudes.

The observations have been corrected for differential extinction using both the principal and the second order coefficient determined for each night.

In Table I the mean magnitudes in the UBV Standard System are given.

The observed times of minima are presented in Table II; a least square solution yields the following elements:

$$\text{Min} = \text{J.D. } 2442692.557 + 0\overset{d}{.}248331\cdot E. \qquad (1)$$

There is a weak evidence which suggests the existence of two kinds of equidistant minima, but this result has to be confirmed. If it is not true, the period must be halved and the cycles number doubled (in column 2). In column 3 of Table II residuals obtained with the elements (1) are given.

The light curve in the instrumental system is shown in Fig.1. The observations have been ordered using the phase computed with (1) and must be read as HD 201599 minus HD 201416; different symbols label different nights.

In order to have a better idea of the variation, the observations made on J.D. 2442692 are shown in Fig.2.

A similar variation is not evident in B and U light, and

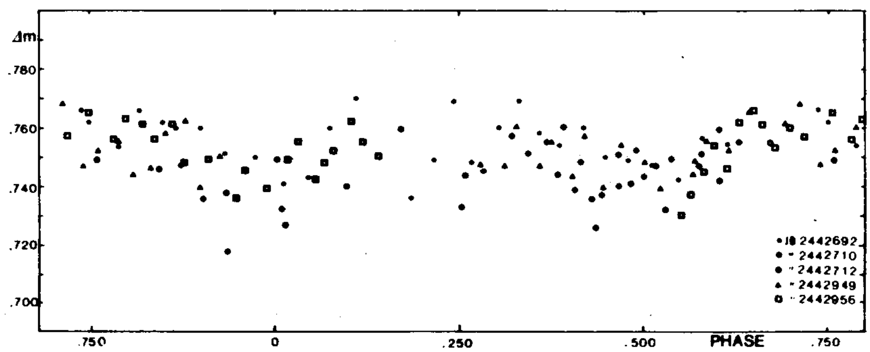
Δm
.780
.760
.740
.720
.700
JD 2442692
" 2442710
" 2442712
" 2442949
" 2442956
.750
0
.250
.500
PHASE
.750

Fig. 1

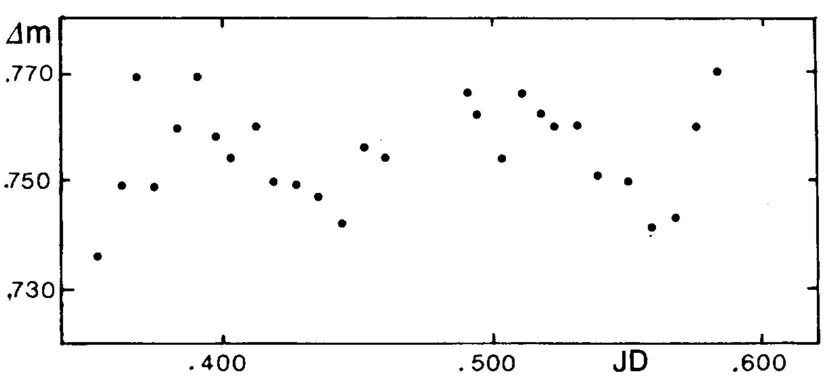
Δm
.770
.750
.730
.400
.500
JD
.600

Fig. 2

this fact may only partially be due to a greater scatter of the data.

On J.D. 2442956 the mean value of the difference of magnitude between the comparison star and the variable is $0^m.03$ greater than the other ones, thus the data of this night have been normalized to the mean value of the other nights.

If the spectral type G5 III determined by Bouigue (1959) is correct, then the definition of the type of variability presents some problems. A reasonable hypothesis might be that the star is an ellipsoidal variable.

In order to have a better insight on this star, a spectroscopic investigation will be started with the new 152 cm telescope.

Table I

Star	α (1900)	δ (1900)	V	B-V	U-B	Sp
HD 201416	$21^h\ 4^m.3$	$+48^\circ\ 27'$	7.78	+1.02	+.61	G5 III
HD 201599	21 5.5	+46 52	7.00	+ .39	-.01	F2
HD 201612	21 5.6	+48 20	8.57	- .11	-.25	AO

Table II

T	E	O-C
2442692.437	-0.5	$+0^d.004$
692.555	0.	-0.002
710.428	72.	-0.009
712.304	79.5	+0.003
712.424	80.	+0.001
949.458	1034.5	+0.003
956.530	1063.	-0.003

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Konkoly Observatory
Budapest
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BC DRACONIS - AN RR LYRAE VARIABLE

BC Draconis (≡Bamberg Variable No.222) was discovered to be variable (1) in the Bamberg sky survey and reported (2) to be a cepheid of period 2.566033 days. Its spectral type was originally described (3) as late B and subsequently (4) as of type F5. On the basis of period-luminosity relationships Irvine (4) noted that BC Draconis was either a Population I cepheid 1730pc from the galactic plane or, more probably, a Population II cepheid 950pc from the galactic plane. Szabados (5) obtained a series of photoelectric observations of this star and in an attempt to resolve the scatter about the light curve of period 2.566033 days he proposed that the light curve is modulated with a beat period of 10.96 days. He suggested that the two periods present in the star were P_2= 2.566033 days and P_1= 3.351 days giving a period ratio P_2/P_1 = 0.766.

Fourier analysis (in the range P>0.2 days) of Szabados' observations has shown that the original period identification is incorrect and is a 1 cycle/day alias of the true period P= = 0.71957 days. The V and B light curves of the variable are shown in Fig. 1. The scatter about the mean light curves has a mean error of 0.036 mag in V and 0.035 mag in B, consistent with the observational error. Apart from the P/2 harmonic of the main period no evidence was found for other periodicities in the data. The light curve appears to be typical of a low amplitude, fundamental mode RR Lyrae variable. Adopting an RR Lyr absolute magnitude of M_B =+1.1, photographic interstellar extinction of 1.1 mag (4) and mean apparent photographic magnitude of 11.7, the distance of BC Draconis from the galactic plane is 380pc.

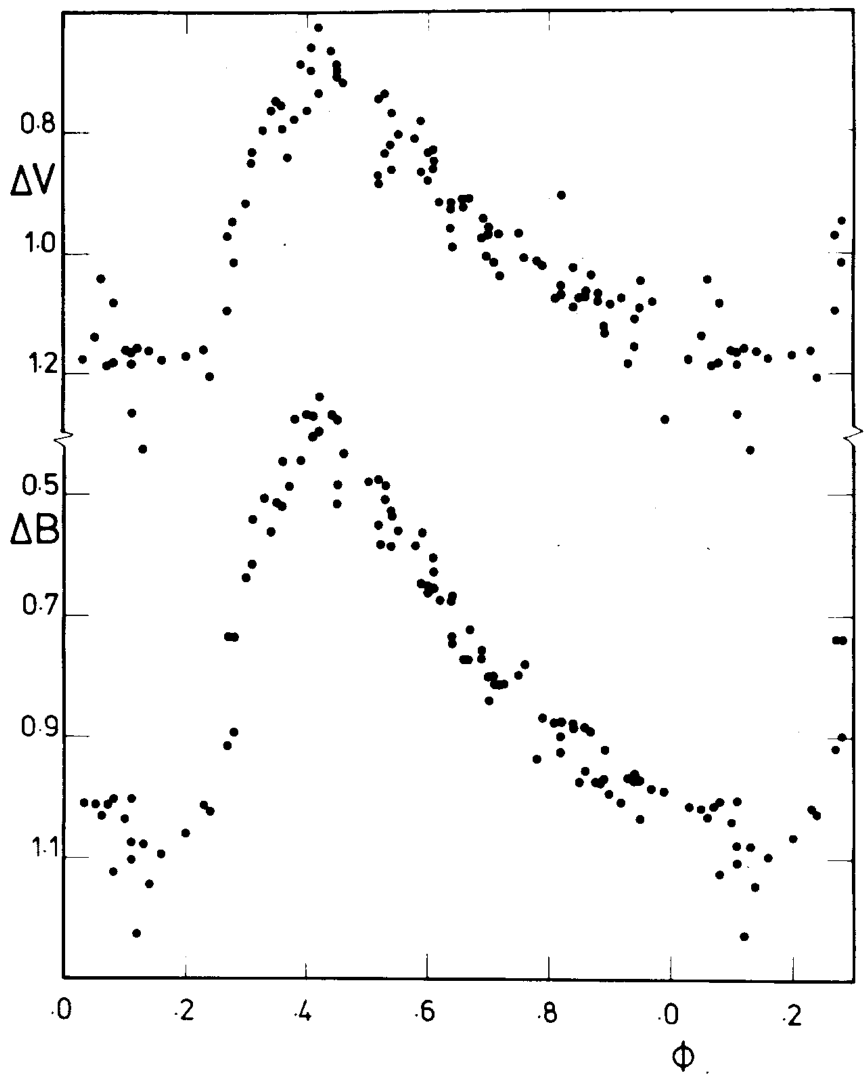

Fig.1. V, B observations of BC Dra plotted with phase
φ = (JD - 2440000)·1.38972

It is interesting to note that in the Fourier analysis the structure of the main peak at f = 1.38972 c/d is single as expected whereas the structure of the major alias peaks at f±1 are double. This unusual alias structure is a direct consequence of the star being circumpolar at the latitude from which it was observed. Thus both the 1 c/d and 1 cycle/siderealday (or 1.0027 c/d) aliases dominate the alias structure.

From Szabados' observations we derive the following elements for maximum light

$$\text{JD (max. light)} = \underset{\pm .01}{2442278.45} + \underset{\pm .00001}{0\overset{d}{.}71957}\cdot E.$$

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Number 1198

Konkoly Observatory
Budapest
1976 November 3

CRACOW OBSERVATIONS OF VARIABLE STARS

Observations of variable stars published by Szafraniec (Szafraniec 1959) cover the period 1920-1950 and were made by Cracow astronomers. There are also many observations made in Cracow during the period 1950-1960 and not published yet. Recently a group of Cracow astronomers (H. Brancewicz, T.Z.Dworak, J.M. Kreiner) has undertaken a treatment of these observations but only for eclipsing variables.The results will be published in very near future.

This material includes, however, observations of variable stars of other types and stars suspected in variability. For those interested in these observations we are giving a list of variable stars and suspected in variability with some informations about the observations. Table 1 gives information about 9 stars suspected in variability. In column 1 we have the name of star as given in Cracow notations, the second column gives the name according to the CSV Catalogue (Kukarkin et al.,1951), the third column gives the number of estimates of brightness and the fourth the period of observation.

Table 1

List of stars suspected in variability

Name	CSV	Number of observations	Period of observation
$-6^{o}6191$ Aqr	-	56	27.07.1928 - 23.09.1949
711.1933 Aql	101915	54	9.07.1934 - 28.10.1934
796.1933 Aql	101912	24	9.05.1934 - 12.09.1934
SVS 543 Cnc	1401	315	27.02.1936 - 17.03.1949
SVS 546 Cnc	1415	151	22.02.1936 - 25.04.1947
6.1933 Cep	102020	114	12.12.1932 - 13.03.1933
2.1934 Mon	931	37	6.04.1934 - 5.12.1936
31.1938 Cyg	5251	11	24.08.1952 - 7.06.1958
7.1938 Oph	4315	1	15.06.1952

In Table 2 we have data for 41 variable stars known as no eclipsing. In successive column are given: 1. the name of the star, 2. the type of variability according to the GCVS (Kukarkin et al., 1969), 3. number of estimates of brightness, 4. the period of observations, 5. the number of volume in which Szafraniec (1959) published the observations made before 1950. It should be remembered that the observations made after 1950 have not yet been published.

Table 2

Name	Type of variability	Number of observations	Period of observations	Vol.
AU And	Lb	51	12.08.1935 - 1.10.1935	3
AD Aql	RV	270	2.04.1925 - 19.09.1929	3
KK Aql	SRb	142	14.05.1937 - 29.01.1949	3
OQ Aql	SRb	223	14.05.1937 - 3.06.1950	3
V441 Aql	SRd	111	30.07.1937 - 29.07.1948	3
V464 Aql	L	115	8.05.1937 - 6.12.1948	3
V830 Aql	Lb	282	8.05.1937 - 6.10.1950	3
VZ Aur	cst?	177	9.11.1925 - 28.10.1934	3
EL Aur	Lb	6	11.11.1933 - 22.11.1933	3
TZ Cnc	Is?	111	22.02.1936 - 25.04.1937	3
VX Cnc	SRb	131	27.02.1936 - 25.04.1937	3
AN Cnc	RRab	530	27.02.1936 - 13.04.1950	3
RU CrB	SRa	9	26.01.1928 - 27.03.1928	3
R Crv	M	36	13.03.1921 - 7.06.1921	3
S Crv	L	45	19.11.1925 - 12.04.1947	3
T Crv	M	251	14.12.1925 - 12.04.1947	3
V386 Cyg	C	170	1.06.1935 - 17.12.1935	4
TZ Del	SR	117	30.07.1937 - 22.07.1948	4
BX Del	Cep	278	31.05.1937 - 6.10.1950	4
BI Gem	Lb	25	12.01.1934 - 3.01.1948	4
AC Her	RVa	65	14.08.1928 - 4.08.1930	4
AE Leo	RRab	26	8.04.1936 - 20.05.1936	4
V439 Oph	Cep	97	28.05.1933 - 6.06.1934	5
BN Ori	Inas	83	27.11.1927 - 17.04.1931	5
V346 Ori	Isa	229	12.11.1934 - 24.02.1951	5
V350 Ori	Inas	290	26.09.1929 - 7.11.1936	5
VW Peg	E?	44	2.01.1951 - 24.11.1954	
V351 Ori	Inas	126	18.09.1934 - 1.10.1949	5
AX Peg	SR?	142	25.09.1933 - 29.10.1936	5
EI Peg	SRa	51	14.09.1934 - 2.07.1935	5
XY Per	In	493	12.08.1924 - 16.11.1936	5
V Psc	*	4	27.11.1927 - 22.10.1932	5
SV Psc	SRb	292	30.08.1933 - 27.07.1935	5
EI Pup	Lb	37	24.02.1930 - 26.03.1931	5
RT Tau	cst	64	15.01.1926 - 26.01.1928	6
WW Tau	SRd	150	21.12.1925 - 19.09.1930	6
SZ UMa	cst?	81	8.12.1930 - 16.03.1931	6
TY Vir	SRd	302	14.12.1925 - 30.05.1937	6
AU Vir	RRc	77	25.03.1931 - 14.06.1931	6
WW Vul	Isa	155	20.05.1933 - 15.11.1934	6
DV Vul	Lb	448	14.11.1930 - 5.01.1939	6

If anybody would like to get observational material for the stars listed in Tables 1 and 2 he is asked to contact with any of the authors of this note.

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Konkoly Observatory
Budapest
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FOUR COLOUR uvby PHOTOMETRY OF THE TOTALLY ECLIPSING BINARY DX AQUARII

DX Aqr was observed on several nights in 1975 with the four-channel spectrograph-photometer on the Danish 50 cm reflector, Cerro La Silla, ESO, Chile (cf. Grønbech et al. 1976). All observations have been reduced to standard V magnitudes and standard four colour indices (b-y, m_1 and c_1). The late-type visual companion at 3".7 was included in the diaphragm. Andersen (private communication) has classified this companion as KOIII: from 20Å/mm coudé spectra.

The primary purpose of the observations was to improve the ephemeris given by Strohmeier (IBVS 164). One primary minimum was followed for five hours and closely covered with 27 points on the descending branch, five points in a total eclipse phase and 16 points on the ascending branch. The total eclipse lasts about 20 minutes from HJD = 2442687.690 to 2442687.704. Combining this minimum with Strohmeier's ephemeris gives an improved ephemeris

$$HJD(Min.I) = 2442687.697 + 0^d.9450132 \cdot E.$$

This new photometric period agrees well with the period given by Paffhausen and Seggewiss (1976) from spectrographic observations and also with the period given in the third supplement to GCVS (3.ed.).

The ingress starts at about phase 0.83. In the table the photometric results inside and outside eclipse are given together with their mean errors. The strong change in the four colourindices during eclipse reflects the dominating influence of the visual companion. Because of this handicap no further photometry of this system is planned. The individual observations reported here are available upon request.

	Outside eclipse Phase 0.71-0.82 (4 observations)	Total eclipse Phase 0.993-0.007 (5 observations)
V	$6^{m}_{.}373 \pm 0^{m}_{.}005$	$6^{m}_{.}779 \pm 0^{m}_{.}001$
b-y	0.275 ± 0.003	0.411 ± 0.001
m_1	0.145 ± 0.004	0.204 ± 0.002
c_1	0.831 ± 0.003	0.659 ± 0.004

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INFORMATION BULLETIN ON VARIABLE STARS
Number 1200

Konkoly Observatory
Budapest
1976 November 5

PHOTOELECTRIC MINIMA OF ECLIPSING VARIABLES

The photoelectric minima of eclipsing binaries listed below were observed with the 60 cm reflector of the Konkoly Observatory (with one exception). The observations were made with an EMI 9502B type photomultiplier (unrefrigerated) combined with 2 mm UG1; 1 mm BG12 + 2 mm GG13, and 2 mm GG11 filters.

Linear elements given in the Second (II) and Third (III) Supplements of the 1969 General Catalogue of Variable Stars were used for computing the O-C values. N denotes the number of observations (each consisting of six individual measurements).

Star	J.D. hel	$O-C_{II}$	$O-C_{III}$	N	Colour	Remark
U Peg	2442347.3879		-.0007	24	B,V	
	2442741.2810		-.0028	52	B,V	
VW Cep	2442679.4272		-.0035	36	B,V	Min. II
	2442680.3996		-.0052	48	B,V	
	2442693.4799		-.0058	60	U,B,V	
	2442989.4692		-.0057	38	B,V	Min. II
AB Cas	2442714.4627	-.0056		64	B,V	
RT Per	2442742.3944	+.0002		40	B,V	
	2442743.2445	+.0009		26	B,V	
TW Cas	2442742.5460		-.0003	54	U,B,V	
	2442775.3942		-.0035	56	U,B,V	
VV UMa	2442815.6107		-.0017	76	B,V	
	2442831.4191*		-.0028	51	U,B,V	
	2442840.3562		-.0016	42	B,V	
SW Lyn	2442786.4493	+.0005		62	B,V	
RW CrB	2442908.4455	-.0001		25	B,V	

*Observed with the 1 m RCC telescope of the Konkoly Observatory.

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